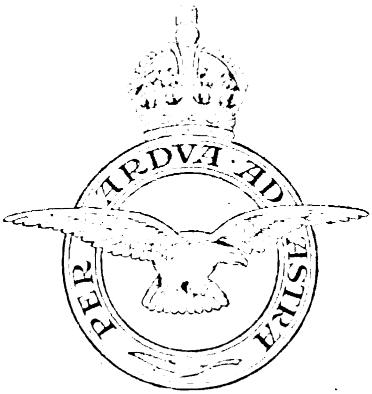
This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

Google™ books

https://books.google.com

UC-NRLF
$B 778 595

LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA



P.
V20
JAN-APR.
1949

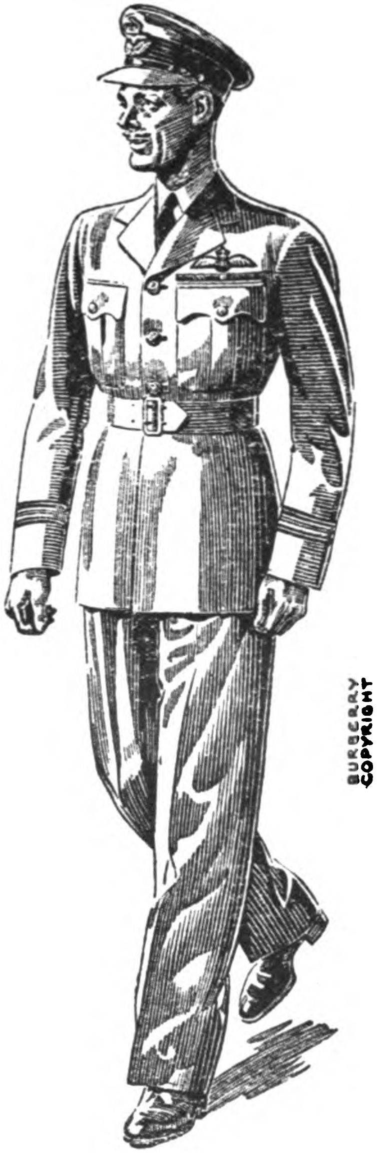
L.S.I.I begins
[illegible]

THE ROYAL AIR FORCE QUARTERLY

AND

EMPIRE AIR FORCES JOURNAL

Vol. 20 No. 1 **Price 6/-** **(NET)** **January, 1949**



"NULLI SECUNDUS"

Burberrys carry a tradition for quality and perfection of Officers' Uniforms and Equipment for the R.A.F.,—"Second to None."

Though Uniforms must conform to regulation pattern, yet Burberry cut and perfection in materials give a smartness that is instantly recognised.

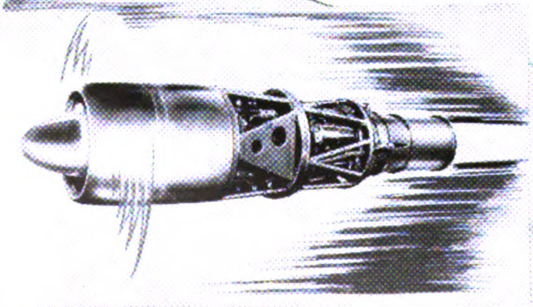
Burberry Service Waterproofs made of the famous Burberry Gabardine give a sense of weather security allied to durability under the most exacting climatic conditions.

BURBERRYS

Haymarket - London S.W.1

Telephone: WHITEHALL 3343
BURBERRYS LTD.

NAPIER
GAS TURBINE
AERO ENGINES

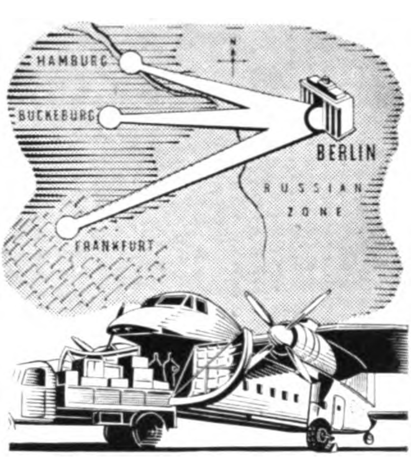


'NAIAD'
propeller turbine

D·NAPIER & SON LTD. LONDON W·3

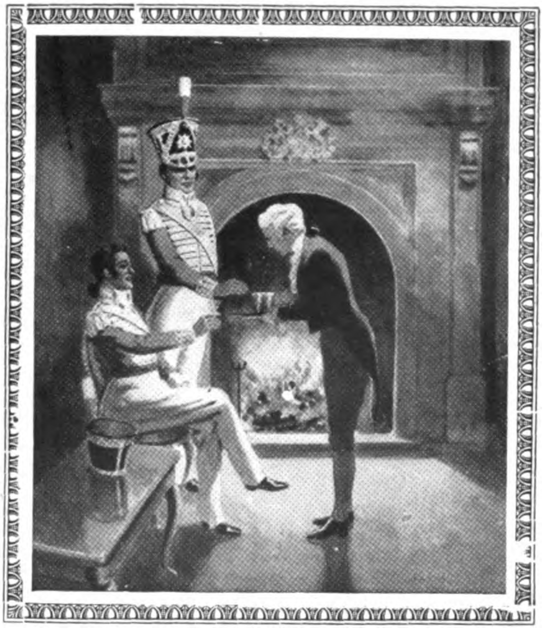
"BRISTOL"
FREIGHTER

the only twin-engined aircraft on the Berlin "air-lift"



In addition to being the only twin-engined aircraft now employed, the four "Bristol" Freighters now operating on the Berlin "air-lift" are the only aircraft in the entire operation consistently back-loading freight from the German capital. The aircraft operate in the Hamburg-Berlin corridor and frequently carry loads which, because of their bulk, cannot be carried by the largest four-engined aircraft on the "lift". Observers on the spot claim that the Freighter is the most successful type of aircraft yet used on the operation.

THE *Bristol* AEROPLANE COMPANY LIMITED ENGLAND



A limited number of New Accounts can now be considered. We are the Firm which specialises in service to Officers' Messes of His Majesty's Navy, Army and Air Force

The Firm which has established a direct link between the Wine Growers and Hundreds of Officers' Messes throughout the Country

BOSTOCK & KIMPTON LIMITED

56 HAYMARKET LONDON, S.W.1 *Cellars*—14 *Seething Lane, E.C.*3

Telephone: ABBey 1441/2 **WINE MERCHANTS** *Telegrams: Boskimtock, Lesquare, London*

REG. MARK

SACCONE & SPEED LTD
(INCORPORATING HANKEY, BANNISTER & CO.)

ESTABLISHED
IN THE YEAR
1839

FINE
WINES - SPIRITS
CIGARS - CIGARETTES
TOBACCO

32 SACKVILLE STREET
PICCADILLY, LONDON, W.1
BRANCHES AND CORRESPONDENTS
THROUGHOUT THE WORLD

VAN HEUSEN

SEMI-STIFF COLLARS

Granted permanent approval by the Air Ministry. Serving continuously in the kit of officers who appreciate the best collar for comfort, smartness and length of service.

Manufactured in two styles to match VAN HEUSEN "Service" Brand Shirts, and also in White.

HARDING TILTON & HARTLEY LTD. LONDON AND TAUNTON

CUSTOMS OF THE SERVICES 5/-

By Group Captain A. H. STRADLING, O.B.E. (Per post, 5/2)

Although primarily written with the intention of guiding newly-commissioned officers, this book will be of interest to all commissioned officers and fills a long-felt want for guidance on customs of the Services.

Printed and Published by
GALE & POLDEN LIMITED
LONDON PORTSMOUTH CHATHAM

Good uniforms; caps and ties, shirts, socks and shoes; and all other items of service equipment — these are just a part of the Austin Reed service.

AUSTIN REED

OF REGENT STREET

LONDON AND PRINCIPAL CITIES · LONDON TELEPHONE: REGENT 6789

SILVER-PLATED, LADY'S BRUSH SET with raised Silver Wings in fitted presentation case. 4-piece (Hair brush, mirror, clothes brush and comb) - £12 12 0
6-piece (Two hair brushes, hat and clothes brushes, mirror and comb) £17 17 0

BY APPT. TO
LATE KING GEORGE V

SKINNER & CO.
(S/LDR. A. E. L. SKINNER)
Aviation Jewellers and Silversmiths

BY APPT. TO
H.M. QUEEN MARY

Specialise in

R.A.F. CRESTED GIFTS · SQUADRON CREST BROOCHES TO ORDER · ENGAGEMENT RINGS · PRESENTATION SILVER

MONDAY
FRIDAY
9-5
SATS. 9-12

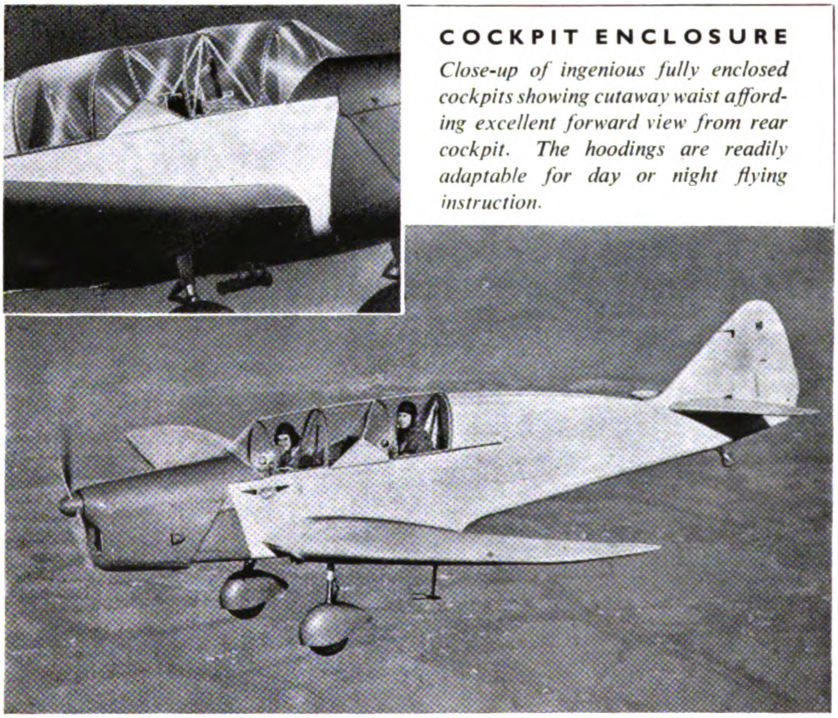
TELEPHONE
REGENT
5115

35 OLD BOND ST., LONDON, W.1

More facts about the Fairey 'Primer'

Structurally, the Fairey 'Primer' is of particular interest — and is suitable for *ALL* climates. The materials used have been chosen for a 'low first cost' machine. Wings and fuselage are of tubular construction, in which bronze welding is employed — advantages of this system are that for repair and maintenance tubing can be welded without harm to the mechanical qualities, and that the work need not be done by highly-skilled personnel.

The 'Primer' is a pleasure to fly, and fully aerobatic.



COCKPIT ENCLOSURE

Close-up of ingenious fully enclosed cockpits showing cutaway waist affording excellent forward view from rear cockpit. The hoodings are readily adaptable for day or night flying instruction.

FAIREY 'PRIMER' AB INITIO TRAINER

[De Havilland GIPSY MAJOR — or Blackburn CIRRUS MAJOR]

THE FAIREY AVIATION CO. LTD., HAYES, MIDDLESEX, ENGLAND

★ *On Duty-Off Duty*

NAAFI

Serves the Royal Air Force

No one but you owns Naafi . . . No one but you, the Service man or woman, benefits from Naafi facilities or Naafi profits!
Naafi is the means by which the Forces buy wholesale, to sell to the Forces retail, retaining for the Forces all surpluses! Help yourself by patronizing Naafi.

The Official Canteen Organization for H.M. Forces

RUXLEY TOWERS · CLAYGATE · ESHER · SURREY

A Selection

from

PITMAN'S

Aeronautical

BOOKS

List

Aircraft Engines of the World, 1948

By PAUL H. WILKINSON. An essential reference work on engines, fuels and lubricants, covering 12 countries, and including numerous jet and turbine engines. 142 full-page illustrations. **50s.** net.

Bennett's
Complete Air Navigator

This is the standard work by Air Vice-Marshal D. C. T. BENNETT, C.B.E., D.S.O., F.R.AE.S., F.R.Met.S., covering the syllabus of the First Class Air Navigator's Licence. Fourth Edition. Illustrated. **15s.** net.

Air Transport Navigation

By PETER REDPATH and JAMES COBURN. Based on a wealth of experience under war-time operational conditions, this American work is a first-class guide for all transport pilots and navigators. Illustrated. 612 pages. **25s.** net.

PITMAN, *Parker Street Kingsway, London, W.C.2*

The name of

T. M. LEWIN

is known the world over as designers and makers of " Colours " by appointment to the R.A.F. Squadrons and Units, in addition to Regiments of British and Indian Armies, Auxiliary, Military and Police Forces in all parts of the British Empire.

DESIGNS SUBMITTED FOR NEW COLOURS

Quotations given on receipt of particulars of requirements

We now have an increased stock of Squadron ties. Please contact us to ascertain if we hold the one you require

T.M. Lewin & Sons Ltd.

Established 1898

103 JERMYN STREET, ST. JAMES', S.W.1
PHONE: WHI 4291

A COMPREHENSIVE
BANKING SERVICE

For nearly 150 years Holt's have been intimately associated with both the issue of Army Pay and with meeting the banking requirements of Army Officers.

Officers entrusting us with their financial affairs enjoy substantial advantages; their Banking Account and the administration of their Service Pay are together handled by one organization—a Private Bank giving the benefits of a world-wide Banking Service that is adaptable, individual and complete in every detail.

GLYN, MILLS & CO., HOLT'S BRANCH
KIRKLAND HOUSE, WHITEHALL, S.W.1.
Bankers and Official Royal Air Force Agents
HEAD OFFICE: 67 LOMBARD STREET, E.C.3
Associated Banks: Royal Bank of Scotland Williams Deacon's Bank, Limited

FROM ALL ANGLES
ALWAYS ON THE BEAM

The H.J. Cap is becoming increasingly popular because it is light in weight and has the comfortable 'feel' of an old friend from the first time of wearing.

THE H.J. SPECIAL FOR THE R.A.F.

HERBERT JOHNSON (BOND ST. LTD.)
Military and Civilian Hatters
38 NEW BOND STREET, W.1 MAYfair 0784

FLAMEPROOF HOSE FOR TEST

NATURE OF TEST

TEMPERATURE ....1000° C

INTERNAL PRESSURE...300 lb p s i

RESULT OF TEST

After 90 minutes, no sign of failure or leakage

DUNLOP RUBBER COMPANY LIMITED

DUNLOP

flameproof

HOSE ASSEMBLY

AVIATION DIVISION, COVENTRY

8H,915

GREATCOATS

ready for immediate wear

also Uniforms complete with rank and ribbons ready in a few hours

TAILORS TO THE SERVICES FOR OVER 60 YEARS

MOSS BROS
& CO LTD
OF COVENT GARDEN
THE COMPLETE MAN'S STORE

Junction of
Garrick and Bedford Streets, W.C.2

Temple Bar 4477

AND BRANCHES

The Chipmunk, de Havilland's trainer for the new era

The de Havilland Enterprise announces that, as the outcome of exhaustive trials in the hands of operators in a dozen countries spread over the globe, the Chipmunk may now be regarded as a developed trainer. It meets the requirements of the Royal Air Force and of civil schools, and is believed by its builders to be the best trainer design for the era which opens before us. It is in production against quantity orders.

The Chipmunk is now ready to replace the Tiger Moth, of which 9,000 were built, and which was the principal trainer of the British and Dominion forces for the 1939-45 war as well as for twenty other air forces. The Chipmunk has the same basic de Havilland power unit, the Gipsy Major. It is backed by de Havilland manufacturing resources in three continents and by the de Havilland servicing organisation all over the world.

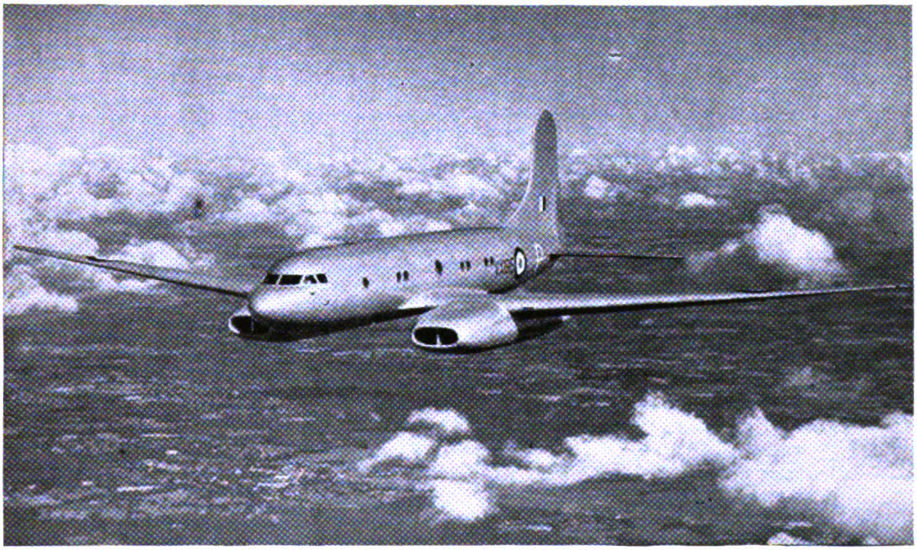
DH AIRCRAFT

DH ENGINES

ACHIEVEMENT

The Avro Tudor VIII

Powered by four Rolls-Royce "Nene" Engines



the first 4-engined jet airliner
in the world to fly

ROLLS-ROYCE
Aero
ENGINES

ROLLS-ROYCE LIMITED DERBY

By Appointment
Naval Outfitters to H.M. The King
Established 1785

Gieves
LIMITED

Outfitters to :

ROYAL AIR FORCE and DOMINION AIR FORCES

27, OLD BOND STREET, LONDON, W.1
Telephone : REGent 2276 ***Telegrams : Muftis, Piccy, London***

BRANCHES
EDINBURGH PORTSMOUTH CHATHAM PLYMOUTH
LIVERPOOL SOUTHAMPTON WEYMOUTH BATH
BOURNEMOUTH LONDONDERRY MALTA GIBRALTAR

UG635
G7A15
v.20

THE ROYAL AIR FORCE QUARTERLY

AND

EMPIRE AIR FORCES JOURNAL

EDITOR:
GROUP CAPTAIN A. H. STRADLING, O.B.E., R.A.F. (RET.)

**Assisted by an Advisory Committee of Members
of the R.A.F. and Air Forces of the Dominions**

VOLUME XX JANUARY, 1949 NUMBER 1

CONTENTS

EDITORIAL 1
THE CROW AND THE MOLE. *By John W. R. Taylor* 6
LIBERTIE AND THE HIGHEST SKY. *By Squadron Leader W. N. Kenyon* 8
THE PROVOST BRANCH. *By Group Captain C. R. Richdale, C.B.E.* 15
WILL THE AIRSHIP RETURN? *By A. J. Huxley* 21
THE INFLUENCE OF MODERN TECHNIQUES OF WAR ON STRATEGY. *By "Aquila"* .. 23
AVIATION HISTORY, 1903-1960. *By John K. Northrop* 31
THE AIR FORCES IN PARLIAMENT. *By Squadron Leader R. F. Pemberton, M.C., T.D.* 43
THE CRESTA RUN, ST. MORITZ. *By Lord Brabazon of Tara* 48
THE R.A.F. MOUNTAINEERING ASSOCIATION 50
WINTER SPORTS FOR ALL RANKS 51
SKI-ING AND THE R.A.F. *By Group Captain T. F. U. Lang* 51
BRIEF NOTES ON OTHER SPORTS 53
A VOYAGE TO PORT SAID. *By Sergeant M. E. Keegan, W.A.A.F.* 54
CONCERNING PERSONNEL 55
NEW YEAR'S HONOURS AND PROMOTIONS 56
EDITOR'S NOTES 57
BOOK REVIEWS 63

ALL RIGHTS RESERVED

LONDON:
GALE & POLDEN LTD., IDEAL HOUSE, ARGYLL ST., OXFORD CIRCUS, W.1
AND AT ALDERSHOT AND PORTSMOUTH

Per Post, Six Shillings and Sixpence *Price Six Shillings (Net)*

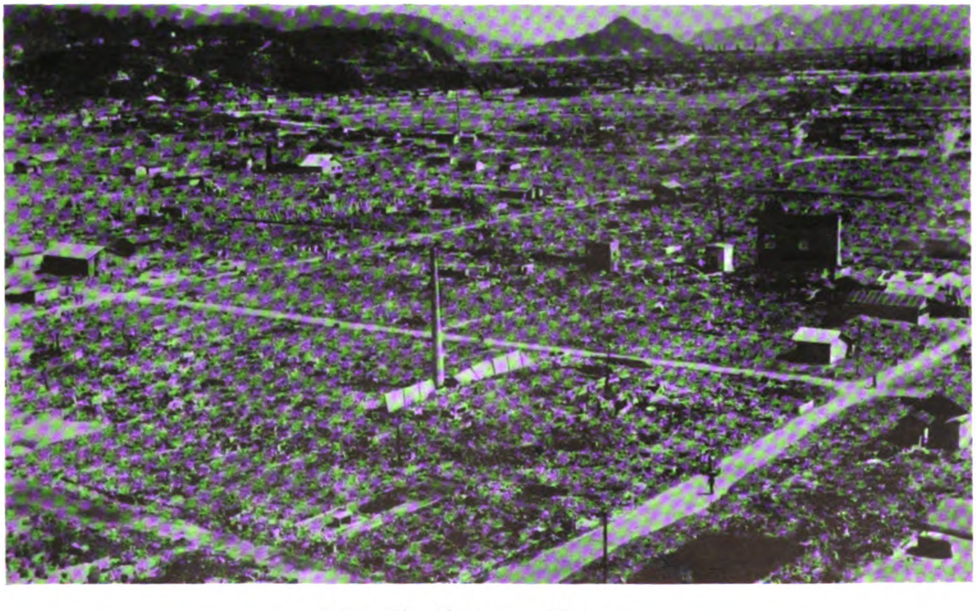
M744162

WILL REASON PREVAIL ?

is it to be
THIS ?

UNO backed by adequate military force . . . Peace.

OR THIS ?



More Hiroshima . . . War.

Frontispiece

EDITORIAL

PEACE OR WAR?

TENSION in the international situation has shown but little change. This question, so vital to all of us, still overshadows all our thoughts and we watch with interest, not unmixed with anxiety, all the moves and countermoves between the Western Powers and Russia.

The latter still passionately desires influence and the spread of Communism; the former are equally ardent in their wish to continue their own democratic way of life, and undoubtedly would fight rather than surrender their freedom.

Any prophetic statements at a time when the future of civilization hangs in the balance would be ill-advised and positively harmful, but everyone should be made to realize the difficult problem with which the Western Powers are faced.

We have seen during 1948 how tragic is the fate of the impotent nations in these days of *power* politics.

Weakness is an irresistible temptation and invitation to a potential aggressor. It is therefore imperative for the Western Powers to build up their *operational* defence forces, at least to a strength which compares more favourably with those of Russia than they do at present. They must attain strength in all its aspects—moral strength, economic strength and military strength—if they are to maintain a peace that all of us so earnestly hope for. Enormous potential reserves of man power and material are not enough. Unless adequate operational forces exist, to provide time to mobilize these resources, they are likely to prove of very little value.

A study of the present military strengths of both sides today is not encouraging to hopes of peace. An indication of the temptation to Russia to act as an aggressor now can be seen by comparing her military strength in Germany with that of the Western Powers:

Western Powers. — Four infantry divisions, two armoured brigades, two parachute brigades.

Russia.—Thirty divisions, of which twenty may be operational, and include eight armoured divisions.

A comparison of readily available man power in Europe of the opposing factions is not without interest. Russia is keeping from 170 to 200 divisions in being (between 2,000,000 and 3,000,000 men) on a peace-time basis, which on mobilization might be increased to between 250 and 300 divisions. The principal initial source of man power for the Western Powers must be in France, whose army numbers 550,000, but its operational strength is far smaller than that, and its equipment is relatively worse than in 1940. Belgium has two formed divisions, the Dutch army's strength today is lower than its previous strength of 30,000, and Luxembourg has no army but could mobilize 15,000 men.

Given time, France could mobilize about one hundred divisions, but this potential expansion would be sadly reduced by the present lack of essential equipment, and today, under existing conditions, there is the question of whether she would have time to mobilize.

Allowing that the Russians lack the mobility of the extensively motorized armies of Hitler, it would still require something more than the operational military forces now opposed to them to prevent the Continent being overrun and air bases being occupied uncomfortably close to this country.

Can the five Western Union nations provide a combined operational force of twenty well-equipped divisions, which would be capable of at least preventing the occupation of forward air bases by the Russians until reserves were mobilized and American aid materialized in full force? This would be one step towards lessening the danger of war, by removing a glaring weakness in the military strength of the Western Powers.

Moscow, fully alive to the situation, is trying to knock France out as an effective fighting unit of Western Europe by a series of Communist-directed "rotating" strikes in all the great French nationalized industries. The success of this plot would leave only the English Channel between Britain and the forces of Communism.

Should this attempt to gain her desires by employing the first phases of the new war strategy fail, will she use the last phase, military pressure, and exploit her vast military preponderance?

It is not necessary to discover what exactly is in the inscrutable minds of the Russians to come to the conclusion that the danger of war suddenly breaking out is very real. We must face the fact that if war comes the threat from the air would be the greatest and most immediate single danger we should have to face, and no longer can we count on having time to build up our defences.

The main burden of preserving the security of the Western Powers, particularly in Europe, will rest squarely on the operational striking force of the air arm. Recently there have been encouraging signs that this is appreciated by the British Government, but the urgency of the matter must excuse our impatience at the slowness of their action at a time when our continued existence is in dire peril. The whole nation looks to this Government to keep us out of war by providing the Royal Air Force, without further delay, with sufficient trained (*skilled*) personnel, material and productive capacity to back up an air effort that might at any moment be called upon to maintain a stupendous air war. This might call for an adjustment of our economic life, as without economic strength it would be impossible to maintain adequate military strength to deal with the present situation. Readiness is strength; are we ready for likely eventualities?

The Regular Air Force

If reliance for peace is first and foremost to be placed upon the strength and efficiency of the Royal Air Force, then there will have to be an immediate improvement in the number and quality of personnel recruited for the regular air force.

Apart from the urgent need to change the present recruiting system, the conditions in the R.A.F. will have to be made far more attractive than they are at present. One of the main causes of poor recruiting is the unpopular new pay code which the Services were reluctantly compelled to accept in 1946. It deterred a large number of the best of our officers from remaining in the air force and an even greater number of highly skilled mechanics from re-engaging for an extended period of service. Many of these airmen considered that their position under the new pay code was so bad, and compared so unfavourably with that of trade unionists, that it was not fair to them, or to their wives and children, to ask them to remain in the R.A.F. If that was the impression in 1946, how much worse it is now can be assessed by the many increases in pay in civilian occupations since, and the fact that it is unbelievable that skilled men will be content to serve in the air force at far lower rates of pay than those in civilian life. The fact that there are advantages which airmen enjoy must be taken into consideration when assessing their rate of pay, but against this must be weighed the many disadvantages of service life, the type of accommodation, service restrictions, frequent moves and separation from families by overseas postings.

Today it is felt that when an airman compares his position with that of his friends in civilian life he can find little cause for satisfaction. It is realized that the continued rise in wages is undermining the financial stability of the country, but the fact remains that with the support of highly organized Trade Unions, who feel that their continued existence depends upon their successes in wage increases, this is indeed happening, bringing inflation in prices for everyone and financial instability of the country. The airman, however, has no Trade Union to fight his cause. The Government he serves expects him to obey the service tradition of loyalty in service and uncomplaining in adversity. To his everlasting credit he is both, but is it to be wondered at that our air force is starved of the skilled men it needs to increase its numbers and efficiency to a degree that may deter a potential enemy from attacking this country and save us from disaster if war should come?

It is a complex and difficult problem, which might be solved to some extent during the present crisis by returning nearer to war conditions with larged numbers of women in industry, and a return of war-time concessions to the air force with better pay, which would attract those replaced in civilian occupations by women to rejoin the R.A.F.

As with the airmen, so with the officers, pay conditions are not today sufficiently attractive, and this is especially the case of married officers. There is urgent need for immediate action to remedy these matters without delay to enable this country to have behind it at the conference table an air force of sufficient strength and efficiency to add some weight to its deliberations.

WHAT IS WESTERN UNION?

The phrase "Western Union" is on everybody's lips, yet there is considerable difference of opinion as to what it really means. It is therefore desirable that the meaning of the term should be clarified. On 8th October, 1948, Lord Brand contributed to *The Times* a special article which, supported by a leading article on the same page, throws much light upon this matter.

Western Union received its first official recognition on 22nd January, 1948, when the British Foreign Secretary, Mr. Ernest Bevin, declared it to be the official aim of His Majesty's Government. What then did Mr. Bevin mean by it? Etymologically, the word "union" ought to mean more than alliance or association of nations. Mr. Bevin said it must be a "spiritual union"; and while he agreed that there must be "fusion," that fusion must "derive from the basic freedoms and ethical principles for which we stand. . . . It must be on terms of equality" and "more of a brotherhood and less of a rigid system." From these hints it would appear that national sovereignties are to be scrupulously safeguarded and therefore that any form of "federation" is out of the question.

History provides no example of an organic union of nations without some loss or reduction of sovereignty on the part of the member-nations. Some entirely new form of association will probably have to be devised.

It is important to separate the ideas of political union and of joint defence. The need for co-ordinated defence is immediate: the other can wait. Joint defence does not depend on political union, as every defensive alliance shows, and the Brussels Treaty and the projected North-Atlantic Pact will provide the necessary co-ordination. But the proposal of a Union of Western Europe having been made, the political ground can be explored while effective defence measures are adopted on the existing basis of separate sovereign states.

Lord Brand makes the following points. We do not want to unite Europe in one great State; because our civilization derives from the small city-states of Greece and Italy, and also because the appearance of a "universal state" in a civilization is a "token of decline." "We want, first of all," he says, "to create a community of spirit in Europe, to revivify Christendom, to hold before European men and women a common ideal of friendship and neighbourliness in order to kindle in their minds a moral and spiritual fervour, through the power of which they will overcome the materialistic creed of Communism. We want, secondly, to strengthen the political, military and economic forces of Western Europe, so that the Western European countries may play their full part with other free nations in defence against threatening external dangers."

Federation as we know it is impracticable for Western Europe, and the idea must therefore be got rid of so as to clear the way for progress along practicable lines. So far as can be seen at present, those lines run by way of close co-operation of existing national governments and not by way of the transfer of power to a central government for Western Europe. Co-operative machinery is being rapidly developed as a result of the Brussels Treaty and in the Organization for European Economic Co-operation, and it can be developed much further. The overseas territories and affiliated peoples of the states concerned will also co-operate, since Western Europe cannot be self-sufficient and must depend on trade with the whole world.

But the co-operation of European governments and the governments of their overseas partners is not enough. The net must be cast even wider. What we want is an "Atlantic Community," to include the freedom and peace-loving democratic nations on both sides of the Atlantic, together with the (British) Commonwealth and the overseas affiliations of France, Belgium and Holland. In this connection it was encouraging to note the following announcement in *The Times* of 8th November, 1948:

"It is expected that the preparatory work for a North Atlantic defence pact will be completed by the end of the year, a conference held early next year, and the pact ratified in June.

"The pact is likely to be modelled on the Rio treaty for the defence of the Americas, under which the signatories are pledged to help one another in meeting an armed attack."

Even that, insists Lord Brand, is not enough. "We must do more still if we want to create a unity of soul and spirit, to make all Western Europeans 'good Europeans,' a task much more difficult than that of military or economic co-operation. Each nation by itself and all together must convince European citizens by good government, by equity between all classes, that a free democracy offers more than Communism. And we must learn to be good neighbours. In addition to military and economic co-operation the nations of Western Europe might well create something like the organization of the Pan-American Union with its Charter recently elaborated at Bogota. This is no political or executive body, but an organization which in several important ways keeps before the peoples of all those nations the gospel of the 'good neighbour.' No one can say that Europe, with its record of suicidal wars, does not need such a gospel. Over years, a pan-European Union might have a profound effect."

Lord Brand's observations are recorded here to stimulate, and to provide food for, thought. He himself would be the last person to claim to have already propounded a workable scheme for Western Union. His suggestions are valuable contributions to the discussion, but no more. Years will pass before Western Union takes any recognizable shape; meanwhile there is a vast deal of exploration and thinking to be done. And it is particularly desirable not to queer the pitch by introducing irrelevant topics such as federation and the immediate need for co-ordinated defence. There would also be grave danger, as

Lord Brand points out, in setting up at this time a "deliberate and advisory assembly . . . to consider practical measures for the progressive political and economic integration of Europe," as this would "merely add a fifth wheel to the coach."

Let the subject be studied freely and informally by all who are interested and have experience in these matters; and the resultant idea, when it comes, will be far more likely to succeed than anything produced by formal deliberations prematurely embarked upon.

COMMONWEALTH CONFERENCE, 1948

Those who expected some decision by the conference of Prime Ministers and other representatives of Commonwealth countries which was held in London last October, will have been disappointed. It was a *conference* and nothing more. None of those present was in a position to pledge his government to any course of action. Yet it was important; and several important facts emerged, as the official communiqué issued on Friday, 22nd October, 1948, clearly showed.

One of the most significant things in the communiqué was the deliberate avoidance of the word "British," hitherto prefixed to "Commonwealth" in nearly all official references to the group of self-governing nations that have emerged from what was once the British Empire. Doubtless this modification was adopted in order to reflect the independent status, within the Commonwealth, of India, Pakistan and Ceylon. It may also remove possible causes of offence to Eire and the Union of South Africa, and render it easier for those two countries to remain members of the Commonwealth, to the advantage of themselves and of the other members. The adjective "British" used in this connection may now be reasonably regarded as anachronistic and no longer true to fact. And it is a sign of the unquestioned vitality of the Commonwealth that this important change of style and title has been so characteristically adopted. This unique association of independent and interdependent nations has evolved naturally during the past hundred years; and official phraseology has rightly reflected, after the event, each successive stage in its evolution.

The dropping of the word "British," however, does not imply any reduction in the solidarity of the Commonwealth, which depends as much upon economic, political and strategic considerations as upon the facts that Commonwealth nations were once parts of the British Empire and still recognize the Crown as the visible binding link. Thus the tacit acceptance of the fact of the Commonwealth and the absence of any suggestion that it should become anything else are themselves facts of the utmost importance. The existence of the Commonwealth was indeed the accepted background of the Conference. Against this background the representatives expressed their intention of advising their governments to maintain and develop their mutual relations both in the economic sphere and in matters of defence; and the opportunities offered for frank and full discussion will make future co-operation easier and more effective.

Opportunity was also taken to acquaint the representatives of overseas "dominions" with the implications of the European Recovery Programme (Marshall Aid) and how they may be affected by the United Kingdom's participation in it. They were also consulted on the matter of the proposed Western Union and it is understood that they were all in favour of the United Kingdom's joining with the other States of Western Europe in economic and defensive agreements. They also expressed approval of Atlantic Union as a wise and necessary measure of defensive consolidation against the possible threat of Communism.

But apart from these positive opinions, perhaps the most important advantage gained from the Conference was the opportunity it provided for the representatives of the Commonwealth to get to know one another better in the congenial atmosphere of a political family gathering; and this advantage is reflected in the declared intention to hold similar conferences at least every two years, generally perhaps in London but sometimes, as His Majesty The King suggested, in the capitals of each of the Member-States in turn.

THE AMERICAN ELECTIONS

Apart from the glee occasioned by the fact that all the recognized prophets were proved wrong, the very unexpected results of the American elections were rightly welcomed by the people of this country and of other Western European countries with unqualified satisfaction.

It is a matter for congratulation that President Truman, who has directed the policy of the United States since Franklin D. Roosevelt's sudden death just before the war ended, will continue to be President for another four years at least. There is always a probability, if not a certainty, that a change of leader may involve some change in policy, particularly in America, where a change of President is invariably accompanied by wholesale changes of the officials who implement his policies. And there is a very considerable difference between the position of one who has been elected to the Presidency by a clear majority of his people, particularly after he has already demonstrated both his policies and his qualities by three years in office, and that of one who has become President by default.

But President Truman's re-election was not the only advantage. He returned to the White House with effective democratic majorities in both Houses of Congress and therefore can count on far more backing than he had before. Moreover, he has the strong support of the American people whose votes have reinstated him, and he is uniquely free from obligations to vested interests. The European Recovery Programme is now assured, and an Atlantic Pact may be confidently expected as a further logical application of the so-called "Truman Doctrine" already exemplified in American aid to Greece and Turkey. With America's economic and military backing, the nations of Western Europe can proceed with renewed zest in the business of organizing themselves for recovery and for defence against the threat of Communist aggression from the East.

"PAX AMERICANA"

Little as we may like the expression "Power Politics" and all that it implies of huge navies, armies and air forces, of ruinously expensive armaments and of atomic weapons, it is still true that "the strong man armed keepeth his house."

The history of the world shows several examples of beneficial domination by a great military power. For hundreds of years Western Europe and the Mediterranean countries enjoyed—yes, enjoyed—the Pax Romana. Commerce and culture both flourished under the strong, broad-minded and tolerant Roman administration. Roman citizenship was a privilege coveted and obtained by many thousands of men of the "subject nations." And the collapse of the Roman Empire was accompanied by widespread disasters, barbarian invasions and international quarrels great and small that continued well into the eighteenth century—if indeed they have yet subsided!

During the nineteenth century, however, apart from certain upheavals in Europe such as the Franco-German War, the world as a whole prospered and progressed in enjoyment of the Pax Britannica, when the British Navy kept the seas and protected the merchant ships of all nations upon their lawful occasions. Nor did other nations, except perhaps Germany, seriously resent Britain's "possession" of nearly a quarter of the land surface of the earth; for they realized the advantages to themselves of the domination of a strong and beneficent Power.

Now, as a result of two world wars honourably waged and won, Britain has become too poor to maintain her role as protector of the weak and keeper of the peace; and it appears that this honourable duty and privilege has now passed to the United States of America. The American nation is happily well equipped and well situated to shoulder this responsibility, and some of her leading citizens have publicly accepted it on her behalf. By her economic assistance to the recovery of Western Europe and by her implied support of Western Union defence, she is proving her willingness and ability to fulfil her destiny and to assume the responsibilities so ably discharged in Rome and Britain.

There is no rivalry between Britain and America in this matter. Britain has proudly and efficiently played her part, and she is not envious of the younger nation that has inherited the tradition. She is proud to honour her successor and will loyally give her support and co-operation in a cause which is still her own.

Whether the Pax Americana can be established without recourse to war, time alone will show. It depends almost entirely upon the U.S.S.R. Not that Russia will deliberately provoke a war. Such action will be ill advised. But the recent conduct of the Soviet Union in international affairs suggests that she may, at any time, adopt a course of action which will make war inevitable, whoever may fire the first shot. Nor can the result be in any doubt. If war breaks out between the communist power and the western democracies it may well be the greatest disaster the world has ever known. But it will surely be the last world war for generations. It will remove the present threat to peace, prosperity and progress, and there will no longer be any to challenge the supremacy of the peace-loving nations.

That war may be avoided is our fervent prayer; but if it comes we shall be prepared.

The Crow and The Mole

By John W. R. Taylor

Aircraft can no more eliminate the U-boat than a crow can fight a mole.
—Grand Admiral Doenitz.

DAZZLED by the devastating possibilities of "push-button" weapons of tomorrow, there is a growing tendency in America and Britain to disregard the menace of well-proven weapons of today. Stories of the destruction of Hiroshima and Nagasaki by the atomic bomb have been followed by endless forecasts of what will happen in a third world war, with radio-controlled atom-rockets wiping out cities wholesale. The fact is that although great progress has been made in the development of guided missiles, extensive push-button warfare is still a distant dream—or nightmare.

One of the most dangerous weapons in the world today is the weapon that nearly brought Britain to her knees in the last war—the submarine. Time after time we have been told that carrier-based aircraft, or shore-based aircraft or escort warships "were responsible for eliminating the German submarine menace" by the end of the last war. *This is dangerously untrue, for the U-boat menace never was eliminated.* In cold, hard figures, U-boats sank forty-four Allied ships in the last two months of the European war, which is pretty good for a force which has been "eliminated" so many times in print.

The war against the U-boat was a ding-dong struggle lasting five and a half years, in which neither side retained an advantage for long. Fortunately, the Allies succeeded in subduing U-boat activities at vital stages of the war, notably during the invasions of North Africa and Normandy. Even more fortunately, they were able to end the war before Nazi Germany was able to put into service powerful new types of U-boat that could have brought a return of the dark days of 1941.

Round One of the struggle went to Germany, who started the war with a powerful U-boat force against which Britain could muster only a few hopelessly inadequate aircraft, each armed with two 100-lb. bombs. The U-boats simply sailed beyond the range of these aircraft and there did much as they pleased.

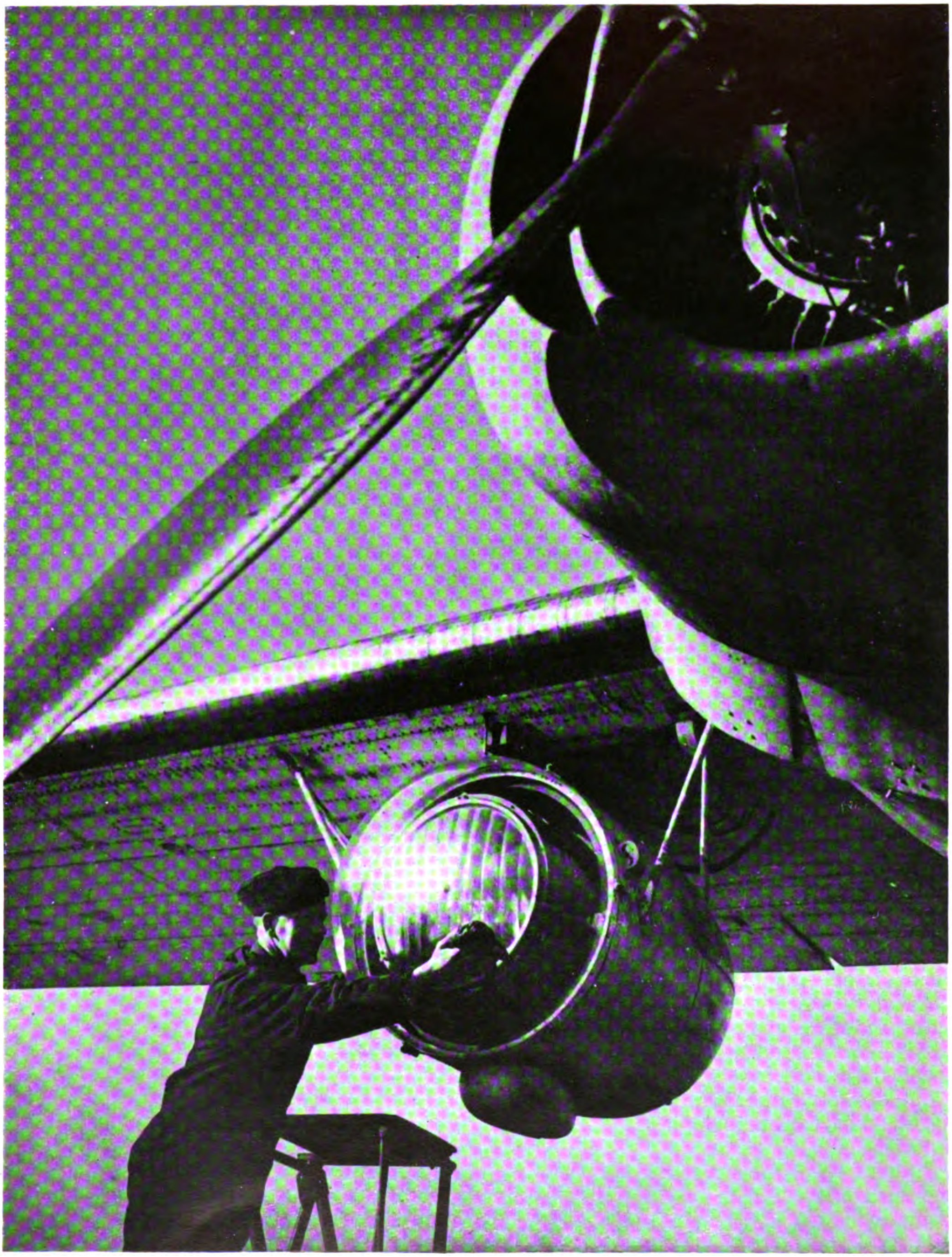
Fortunately for Britain, those early U-boats had a weakness: they had a submerged speed of only two to three knots and had to surface for several hours each day to ventilate and recharge their batteries. So, as soon as they had enough aircraft and the first aerial depth-charges were available, R.A.F. Coastal Command swung over to the offensive, attacking surfaced U-boats in the Bay of Biscay and in Northern waters, *en route* for their patrol areas.

The introduction of airborne radar in May, 1941, gave the R.A.F. its first real break. The difficulties of searching with too few aircraft for a small U-boat in a very big ocean were reduced and U-boat killings improved in indirect ratio with a lowering of morale among U-boat crews. They were able to surface only at night, which slowed their progress through the "killing" zones and reduced the time they could spend in patrol areas.

But the respite was only temporary, for when America entered the war the U-boat packs sailed *en masse* for the American Atlantic coast and the Caribbean. There they were able to wreak tremendous havoc among merchant ships that had virtually no air cover. In fact it was all so easy that they no longer minded having to waste time getting through the Bay of Biscay. Killings fell off and the grimmest period of the struggle began.

The R.A.F. countered in May, 1942, with the radar-guided airborne searchlight, which came as a terrific surprise to the enemy, who often could not detect the presence of the aircraft until they were illuminated. They had no time to dive and were not fitted with anti-aircraft guns. In desperation, they surfaced by day when, at least, they could see the searching aircraft. This was just what Coastal Command had hoped for, and U-boat after U-boat was sent to the bottom.

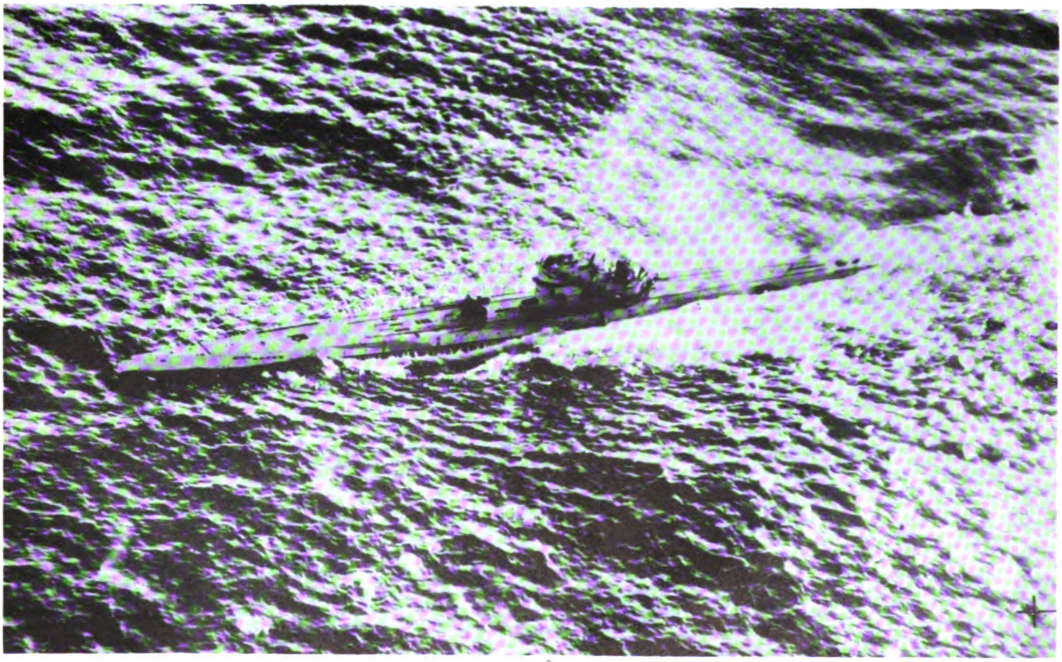
The struggle had developed into a combat to the death between Allied air power and the German U-boat flotillas, with the future of the civilized world as prize. It is to their credit that the



A Coastal Command Liberator equipped with the Airborne searchlight.

Face page 6

U-boat sighted and attacked by depth-charge and cannon-fire.



Close-up of U-boat, shortly before it blew up and sank.

German Higher Command never lost faith in the U-boat, believing, as Grand Admiral Doenitz remarked, that "Aircraft can no more eliminate the U-boat than a crow can fight a mole." He forgot that the German "mole" had to come to the surface to breathe, and he could not have known then that the "crow," never sleeping, would one day have eyes that could see equally well by day and night, and "talons" that could attack the "mole" even when it was beneath the surface.

Slowly the extent of the air attack at sea mounted. The first long-range bombers went into service simultaneously with tremendously powerful new depth charges. In the Bay of Biscay sinkings increased by 300 per cent. But there was still a 600-mile "gap" in mid-Atlantic, beyond the range of land-based aircraft from Britain or America, and it was here that the U-boats concentrated their attack against the ships bringing food and war supplies to Britain.

In January, 1943, at the Casablanca Conference, the defeat of the U-boat was made No. 1 priority commitment of the Allied Forces. Within five months the turning-point in the U-boat war was reached. Very long-range four-engined aircraft flying a shuttle service between the United Kingdom, Iceland and Newfoundland closed the "gap," and the first escort carriers, equipped with fighters and torpedo-bombers, went into action with outstanding success.

For the first time successions of complete convoys began to get through to Britain without loss, although often surrounded by U-boat packs which dare not attack in the face of the continuous air escort. The U-boats were by this time armed with anti-aircraft guns and, when sighted, usually decided to fight it out fiercely on the surface. This only resulted in even more sinkings. At about this time, also, the Royal Navy allocated ships to co-operate wholly with the anti-submarine aircraft and thus was born the air-sea team which put paid to the U-boat's last chance of victory. The U-boat war was by no means over, but the return of U-boat "killings" rose steadily. In three months to August, 1943, the enemy lost thirty U-boats a month, which reduced the number operational in the Atlantic by 50 per cent.

German scientists were constantly working on new devices to counter the Allied anti-submarine forces and the enemy never lost faith in the war-winning potential of the U-boat. But for a time he had had enough and had to wait for new equipment. This waiting cost him the chance of breaking up the vast invasion armada on D-Day, and so cost Germany the war. It was estimated that 130 U-boats would be available on D-Day and that this number would go up to 200 by D plus 14. But so completely had we mastered the situation that not one U-boat succeeded in reaching the convoy lanes or the assault area during the first vital stages of the invasion. Later they made some half-hearted attacks, but too late to do any real damage.

Even when the Allies began the last great drive against the heart of the Nazi Empire, the enemy still retained his faith in the U-boat and his reprisal weapons to snatch victory out of defeat.

German scientists did not fail the U-boat crews and even as the war drew to a close new and very powerful types of U-boat were being prepared for battle. Even more important, a device known as the Schnörkel had been developed which enabled U-boats to charge their batteries and be ventilated without having to surface. Fortunately, with the exception of the Schnörkel and the relatively useless midget U-boats, the new devices and new types of U-boat did not have a chance to become operational. But the fact that during March and April, 1945, no less than forty-four Allied ships were sent to the bottom is proof that the U-boat still constituted a grave and unsubdued threat.

Altogether Germany built 1,175 U-boats, of which about 790 were destroyed. Of these, 196—one out of every six built—were sunk by aircraft of R.A.F. Coastal Command—surely the best possible answer to Admiral Doenitz?

But the shadow of the submarine menace still lies across the now peaceful shipping lanes of the world. There are already in existence powerful new submarines able to dive to greater depths, remain submerged for longer periods, and to proceed under water at far higher speeds than any used in the last war. Even more sinister than the U-boat as we know it are the possible future developments, for the U-boat of tomorrow may be nothing less than a submersible battleship or aircraft carrier. Able to approach its target at a depth that would make it invulnerable to attack or even detection, it could surface for a short while to fire off a series of radio-controlled rocket missiles and then dive to safety once more. All that sounds like highly imaginative "science fiction" stuff, but so did atomic bombs and jet-planes a decade ago.

It is against this menace that we must always be ready to defend ourselves. The weapons of the last war are obsolete; we need new scientific aids to detect U-boats far below the surface, new weapons of tremendous power to attack them there and new ships *and particularly aircraft* to carry those weapons into action.

Libertie and the Highest Sky

By Squadron Leader W. N. Kenyon

What more felicitie can fall to creature
Than to enjoy delight with libertie?
Then be the Lord of all the workes of Nature;
Raigne in the aire from the earth to the highest
skie.
—*Spenser, c.* 1570.

IN all the world today men's minds in some degree are occupied with the doubts and fears, forecast and forebodings of war.

Is it inevitable?

Must we be involved?

What form will it take?

These and many other questions rise from the peoples. The answers are confused, for ideologies are involved, a new fifth column is strong in many lands, a great empire has been forced to contract, revolt has been let loose in Asia, and Europe is split.

Even within the services, views are divergent as to the shape of future war. For although our task is simplified by the assumptions of inevitability and participation, science is putting close to our hands new weapons more portentous than the invention of gunpowder.

There are many factors which obscure a picture of the future. Not least among them is a form of military conservatism. This is preoccupied with the effect on field tactics of what are essentially strategic weapons. It fails to recognize that the advent of air power and certain other devices within fifty years may well change the nature of war itself, and, if allowed to do so, it would distort the development both of aircraft and weapons so that they could the better serve a bare step forward from the recent past.

From this traditional viewpoint the fight is considered *in vacuo*. It begins as a simple extension of national policy. The object of war is to win it. To win it means to defeat the enemy armies under a favourable air situation, and, if necessary, to occupy enemy territory in support of a chosen regime.

But a growing number of people contend that war cannot be thus considered as a phase apart and that the circumstances surrounding the act of war may govern the mode of conduct.

Before we consider the war of the future, let us look at the future of war.

The World on the Edge of Peace

A glance at the modern world shows that within three years of the end of the greatest war in history the international field is as unsettled as ever, and fighting is widespread. The governments of France and Italy survive in insecurity. There is civil war in Greece. Jew fights Arab. Hyderabad has striven in vain to avoid enforced assimilation. Burma and Malaya are in revolt. Indonesia has barely tasted peace before another call to civil strife is heard, and the peoples of China are so stricken with endless warfare that security and prosperity have receded far beyond their horizon. Even the South American states attempt the acquisition of new land.

Side by side with these conditions we see the United Nations Organization, busily ineffective. This is the second attempt in recent years to ensure peace by providing permanent means for the discussion of problems, together with the possibility of enforcing the opinion of a majority of nations.

Despite this anomaly of peace-organization and continuing conflict, it is apparent on closer examination that the world is nearer the boundary of an enduring peace than ever in the past.

Yet it is the major powers which have lost most by recent war, and which have taken the lead in forming the peace organization. Why, then, the potential struggle?

The great nations are in different stages of development as members of world society. Those in Europe have built colonial empires, have increased their populations and their wealth, and have been engaged in war to such an extent that their resources have drained away. They are no longer interested in expansion based on arms. They are only concerned to maintain their standards by development of their remaining resources and colonies. They even appreciate that such development must be mutually beneficial. They are near the end of the road.

At the other end are India and China. These have tremendous and hungry populations whose pressure might menace the remaining world. But they lack technical capacity, and no one fears that they may wage a great aggressive war.

Between these extremes lie Russia and America. Self-sufficient America does not need economic expansion. What she does not possess, like rubber, she is able to trade for or to substitute. But her part in recent wars has done no more damage to her standard of living than the Boer War did to the British. Though America may be eager to learn the lesson of Europe, she is by no means war-weary and may be that much more willing to engage in it.

Russia has suffered severely by war. Her people must in consequence be interested in peace, if they are allowed to believe in its attainment. But the people are informed and led by no one but their rulers, and their rulers may be impelled by their dynamic political ideas to play with fire as far as the ignition of the world.

It is clear, then, that although the many minor conflicts could be dealt with, a potential struggle lies in the out-of-phase development of the materially powerful groups. This is the sole insoluble, the final obstacle on the perimeter of peace. It is for war between these major groups, and only for this sort of war, that the bulk of our services will be designed.

What is this sort of war?

THE CHANGING NATURE OF WAR

Total War

The commanders of the past ensured that their armies were as big as they could procure. We cannot doubt that the resources of nations were deeply involved, when we read of the poverty which followed conflicts like the Napoleonic Wars.

But before 1914-18 there was no deliberate and informed attempt to employ for war the whole resources of a nation. Such full employment could not be approached until the complex economic constitution of a trading nation was understood. This understanding is recent, and not yet free from controversy. Nor could this employment for war be achieved in a *laissez-faire* economy as readily as in the centrally controlled systems which now occur in varying forms throughout the world.

The last war showed that we now know how to shape these war economies. Indeed, Germany overtly designed one for years before 1939. We can be certain that the same technique will be employed in the future, applied with greater knowledge, thoroughness and efficiency. The armed services will stand at the tip of a spear whose shaft is grasped by everyone. The spear does not represent men alone. It is coal and steel, corn and skill, and, some would say, character and soul.

It follows that injury to any part of a nation's activity will impair its capacity for making war. We have used blockade and bombing, as well as direct land warfare in the past. The choice of targets in the future will depend on weapons and enemy weaknesses. But no aspect of enemy welfare will be exempt from consideration, and in striking at this welfare, enemy armed services need be fought only in so far as they will not let themselves be ignored. They are not the final objective. Future war will be true total war.

The Changing Aim of War

In the past, wars have been fought for the ambitions of rulers, the propagation of religions, but more recently in order to open up to commerce the undeveloped areas of the world and thereby fill the pockets and the stomachs of rapidly increasing populations. Lately we have fought defensively to maintain control over our assets in the face of rivals like Germany. Lastly, we have fought merely to preserve our social, material and spiritual standards, with neither thought nor prospect of improving them. Having partially preserved them, our only other concern has been been to ensure that the rival nation will not repeat the attempt in the foreseeable future.

Victory has been confirmed in many ways. The early attitude was clearly stated by Clausewitz: "In theory, the complete overthrow of the enemy must be the aim of warfare. *But it is not necessary for peace and is rarely achieved in practice.*"

Truly, it is not necessary for the *onset* of peace, but when it is not achieved, war recurs, as we have seen so well since Clausewitz's time. Each mode of confirmation has so far been a failure, though it is too early to judge our efforts since 1945. At one extreme, cities have been put to the sword. But enlightened international thinking now forbids destruction as a punishment. In any case, we are now concerned with nations, not with cities, and such treatment of the vanquished has for long been an impracticable proposition.

At the other extreme are modern treaties, promises of good behaviour with added safeguards. The outstanding example is the Versailles Treaty, which the Allies were able to impose on Germany under the threat of penetrating deep into that country with their armies. This treaty sought to prevent recurrence by denying the material means of making war. Enemy armed forces were limited. Enormous reparations, which many people believe mistakenly to have been purely penal in motive, sought to reduce Germany's wealth so that there would be no surplus for armament production. At first, factories were inspected and a vital area was occupied. But when inspection was thwarted and occupation ceased, the treaty became worthless.

And now, after 1945, we seek not only to deny the material means of making war, but to "re-educate" the vanquished, and so to remove the desire for it. This last method requires prolonged, and armed, occupation and makes such heavy demands on our impoverished resources that it would certainly not be possible if the enemy nation were much larger than Germany.

There is one more way of accomplishing our aim of preventing further conflict. It has rarely been considered. It has never been tried. And though it bears in itself the elements of frightfulness, it cannot be neglected; for though we dismiss it, our enemy may not.

We have seen that, among the major nations, populous India and China are not feared because they lack technical resources. We know that Russia fears the West, and the West fears Russia, because each group has the man power and the material and technical resources. There is, then, a margin of material, technical capacity or population which, if removed, would ensure the peace. Surely, the large-scale removal of this margin can be best accomplished by continuing, beyond the point of bare enemy defeat, the processes of selective destruction with which total warfare will be conducted. Indeed, if treaties are unacceptable and occupation be impossible, this is the only way.

The characteristics of future warfare can now be summed up thus:

Future war is total war, and concerns large groups.

All aspects of national activity are liable to be attacked.

Our aims are self-preservation and the prevention of a further conflict.

To prevent a further conflict, we would like to deny the enemy material means for making war and to eliminate the desire for a further attempt. This at present means prolonged and costly occupation.

If occupation should be impossible, the enemy nation must be maimed, in its economy, its population, or both.

The first four points are generally acceptable; not so the last. Are there no effective moral bars? And is it nowadays a practical proposition?

Consider the ethics, then let us look at the weapons.

ETHICS AND TOTAL WAR

Certain forms of warfare have been declared by many countries to be unacceptable.* The main tenor of the argument is that warfare must be directed at the armed services, and that a weapon shall not be used if it is indiscriminate in its effect.

Mr. Spaight has ably argued that the atomic bomb is included by implication. But he wisely points out that similar arguments have been used against the firearm, the torpedo, and the British blockade of Germany in 1914-18, which is said to have killed 700,000 people indirectly. Similarly, the R.A.F.'s recent attacks were said to go to the absolute limit of legitimate bombardment, if not beyond it. But whatever the legal agreements intended, foresaw or implied, we know that ethics have given way to expediency in time; all these methods have been used; agreements fail to restrict warfare.

At least, one might say, the agreements specifically mention "gas and its analogues" and "bacteria," and gas was not used in the last war. But there are more practical reasons why gas was not used, which have been revealed by the Germans concerned. Among them, we must remember that the High Command had been assured of quick results from gas in 1914-18, and it had cost them dear. There is little doubt that these weapons will be used if the results they offer look promising enough, as they now do.

Finally, what is indiscriminacy? It used to be the kind of distinction between the soldier, whom one could legitimately shoot, and the steelworker, whom one could not. Nowadays we recognize that war is founded on civil production; both men are one's target.

Let us put these paper quibbles aside. If nations were really prepared to abjure certain weapons and activities, they would readily produce new agreements, institute international control, and dispel all doubts. There is no prospect of agreement or control, and we must not expect effective limitations on ethical grounds.

But we must nevertheless guard against the false use of moral arguments by our enemy. He may well renounce, ostensibly because they are immoral, those weapons which he does not possess in quantity. It is our duty in the services not to let political hesitancy, or propaganda instituted by enemy representatives within our borders, deprive us of our most effective weapons.

THE WEAPONS

In the future we will have within our grasp the products of enormous technical advances. Many are there already. Television, radar and infra-red vision. Potent gases, bacteria and atom bombs. Unsweepable land and sea mines. Rocket artillery and long-range missiles. Pilotless aircraft and flying bombs. Beams which hold an enemy in an ethereal but unrelenting grip. Homing, steering and fusing devices of many kinds. Fast submarines which need not surface. Engines of enormous power and aircraft of great speed. Meteorological warfare which may turn homesteads into lakes and pastures into desert. We are indeed becoming the "lords of all the workes of nature" to an extent which Edmund Spenser could scarcely have foreseen.

---

*Geneva Protocol, 1925. Versailles Treaty (Art. 171). Hague Declaration and Regulations

This profusion can be sorted out in many ways. Broadly, they can be divided into:

Supplements to vision, detection and location which will affect many arms.

Obstacles which may block the path of armies and, in narrow waters, ships, but which cannot block the air.

Faster, more accurate, longer range or less easily countered means of delivering some injury to the enemy.

More potent means of destruction to be delivered, currently described as weapons of mass destruction.

Now, a great many of these devices will find useful employment in land warfare. They may necessitate wide dispersal, make movement costly and obstacles more difficult to cross. But though tactics change, the essential pattern of an army's war will not have changed. Today a hill, tomorrow a river, and only some day that town, that factory, that centre of communications without which the enemy can longer resist in any sphere. No, the new weapons may mean modification, even stalemate, but they do not mean revolution on the land.

Again, in the air, we expect a small margin of speed between bomber and fighter, with many consequent difficulties in defence. We may see the short-range interceptor rushing almost vertically to the bombers' predicted position, and there firing a guided projectile fast enough to reach the bomber in time to spoil its mission. We may see rockets sliding swiftly up along a beam locked on the enemy. But, basically, these methods will be akin to those we have already used.

The revolution lies in the last category, the weapons of mass destruction. It is not peculiar to them. They happen to complete a chain of coincidental development which is destined to remove major offensive from the sphere of land operations. Because we now have:

The realization that the true target of war is the enemy state and all that makes a state. (Total war.)

A further cogent reason for attacking the same targets. (Peace by destruction.)

A means of delivery to those targets. (Air Power plus other projectiles.)

The weapons capable of doing the job (of mass destruction).

There are those who will be quick to say that the late bomber offensive was not the hoped-for means of quick decision; that it turned out to be attrition, like sea-blockade. And there are many who would answer by pointing out that only 7 per cent. of the direct war effort was employed on bombing.

It does not matter. Let us hasten to agree that the bomber was only a great advance in transportation, and that the revolution was incomplete until a similarly great advance in the means of destruction had been made.

There are two further points about the weapons. They favour the offence, except in the land battle. And, if not decisive, they offer great advantage to those who make the first attack.

THE ENEMY

Service men are not given to naming their enemies publicly. We are therefore free to examine the characteristics of the worst case—the features we would prefer our enemy not to have. These would be:

A large population, highly industrialized, giving great power for war.

A general dispersal of population and industry through the country, with the more vital industries situated deep inside, and protected.

A large land area, producing enough food for the people, and enough minerals and other raw materials to make the nation independent of imports, and able to ignore blockade of her frontiers.

Multiple communications, making interruption difficult.

A politically closed country, with sources of information controlled, and proof against propaganda and the news of disaster. A highly centralized government with a tight grip on the people and on all activity, making little adjustment necessary to direct the nation's efforts upon war.

A politically trained population which will resist an enemy with sabotage and guerrilla warfare even when no longer shielded by its own forces.

No large nations have all these characteristics, but Britain and Western Europe have some of them; America and Russia have many of them. The British Commonwealth also has many, though it is distinguished by a fragmentary constitution and "internal" lines of communication which depend on the sea and are therefore very vulnerable.

What do these features mean?

A state so constituted cannot be defeated by the elimination of a few features; certainly not by the much-talked-of knock-out blow.

The whole of it cannot be defeated by an invading army, unless that army be very much larger than any we have seen so far. Napoleon in 1812, and Germany's many divisions in 1915 and again in 1939-45 were defeated by kilometres as much as by Russians.

Such a country is a difficult air target, for deep penetration is necessary and attrition relatively slow. Nevertheless, when navies cannot reach deep inside a nation and armies would be swallowed up in it, the only feasible attack is through the air.

If land-mass and population are such as to offer an impracticable task to an army bent on fighting, they are, *a fortiori*, too much for a police force whose task is to demonstrate the good intentions of the victors and to lend support to the re-educators. This may remain true even when the enemy armed services have been paralysed by air attack.

In short, plain geography confirms the conclusions to which we are driven by a study of the motives of future war or the capabilities of future weapons.

The Lands of Liberty

Britain lies on the edge of one of the main world-masses of population. She could not exist for long (as, say, a member of a Commonwealth or American group) if the whole of that population, right up to the ocean, were hostile. Our British picture of future war, if it is to be a reasonable one, must therefore envisage Britain and Western Europe as members of the same group, in the long run.

This group is very rich in industry, but is deficient in food and many vital materials, like oil. It must be, and is already, integrated with those nations overseas which produce those deficiencies, whatever the national ideas involved may be. This, in turn, broadly defines the military integration.

Britain and Western Europe have distinctive weaknesses. The people and industries are concentrated in small areas. Communications with the primary producers are long and depend on the sea. The depth of land lying before enemy armies is small.

While air bombardment must provide our main means of offence, the means of defence must therefore be more orthodox. No push-button technique or air force alone could prevent a rush of enemy armies through Europe, nor save the ships at sea.

These weaknesses could be overcome with proper organization. A mobilization of 25 per cent. (which is smaller than in the last war) would produce a mixed army of over four millions, after allowing for navy and air force. It is a short step to envisaging these heterogeneous armies, including the British continental contribution, commanded by the French, who would produce the greatest numbers. Denial to the enemy of the wide European ocean frontages would go a long way to solving the submarine problem.

But, to be effective, substantial armies must be kept at readiness and the sole consolation for the high cost of this insurance must be the greater price of failure. Only in this way can the homes of the brave remain in the lands of the free.

Blow Cold, Blow Hot

The European nations, as well as others, are undergoing great social changes which naturally give rise to some antagonisms. We have seen how these internal political differences can be exploited in the field of foreign affairs, and how a dictatorship has the advantage of democracy in political upset. Democracy can only lose a cold war.

Aggressor nations have often in the past attempted to appear the injured party. Sometimes, like the Prussians in 1866 and the Germans in 1939, they have gone to great lengths to give the impression of reluctance to nations who they hoped would remain neutral. But as the groups involved in war become larger, there will be fewer nations left to please. Democracy can forgo the injured look.

In the past two wars, democracy has stated that it would fight if a given country were attacked. It must now be clear that if a given point in cold war is passed, it must be converted into a hot one, the sort democracy can win. In this conversion, we gain the advantage of the first attack.

Outbreak

Against this factual background, our future war breaks out by accident, for the aggressor-group has underestimated the firmness of intention of its antagonists. As each move in political aggression became more difficult, the enemy approached nearer to the danger-point, taking preparatory measures for war both as a precaution and to deter the democracies from taking the decision to fight.

Thus at the crucial time numbers of submarines have allowed themselves to be seen near the trade routes, and military movements have been made with only a pretence at security. But now the enemy has miscalculated and gone too far; the democratic people are at last as convinced of the need for war as their armed services are ready for it.

THE FIGHT

Far over the world, footholds for the reaching tentacles of air power, lie many bases. For years they have been bartered and hired, planned and prepared, encircling the enemy land.

Some are large-scale airfields, known to all. Some are small, well guarded and concealed, the secret home of some swift missile whose snout has long been directed at the course it is to take. Some are in embryo, bare runways awaiting the aircraft which will bring in all that makes a base; messes and men, workshops and control, nylon fuel stores and pipelines laid by air. Some must be "borrowed," seized from a neutral state by airborne troops, used for essential tasks within their reach, and quickly left.

The missiles fly and, lacking sufficient range, fall in a shallow zone within the enemy frontier, on predetermined targets. Concurrently, strategic bombers move on lonely tracks, concealed by distance—over the polar ice, the frozen desert and the virgin forest. Behind the mountains, through the deep valleys, over the craggy monasteries, from north and unexpected south they come. So far unhindered, for the enemy lands are too wide to cover with a compact air defence, which is perforce confined in many "islands." Where base and target are too far apart, the bombers fly in company with tankers. They carry fighters for their own defence. They strike unwarned.

This first blow struck, secure in its surprise, other more public measures follow. War is declared, ships are diverted, civil defence warned, reserves are called.

As with the air defence, the protective armies were deployed in peace-time. They lie across Europe like a shield, keeping a ceaseless watch; watching with thermal eyes for enemy movement; probing the land with radar for assembled armour; alert for the spangled, softly sinking clouds which block the instruments and herald an attack.

Their fire-power is immense, their rocket-guns are light and swiftly moved from place to place. The little pools of soldiers lie in a deep honeycomb of mines. The freshly mobilized units add depth to this defended zone, and supplement reserves practised for many months in swift lateral movement over ground they know. The defensive structure has the strength without the shallow inflexibility of the Maginot Line. Its task is to attenuate and dry up the enemy attacks which are delayed only by the final ponderous preparations for a ground assault.

With no great forward stride intended, tactical movement small in the defended zone, and troops' equipment light, the streaming mass of helpless transport has vanished from the roads. The vehicles which serve the forward troops are squat and strong—and relatively few—and creep across the land on tracks, at will. The system of supply is well spread out, using in full the many minor roads; for while no slender line of little guns can save long arteries from air attack, a steady seepage through capillaries goes on unhindered. Air supply, too, is used, but with reluctance, for there are many demands which range from small task forces whose only link this is, to the movement of strategic air forces and the capture and supply of temporary bases.

All troops and installations are concealed, protected and dispersed to withstand repeated air attack, for we believe the enemy has made the fatal mistake of continental armies, and has designed his main air forces to support the ground, instead of striking straight against our people.

Meanwhile the second air bombardment follows up. This time the targets lie within a zone which stands, in enemy land, before our armies. The zone is deep. The object is to keep a *cordon insanitaire* of devastation which at worst will hinder enemy movement and the resupply of missiles, may bog them down in fleeing population, and at best may keep the bulk of missiles out of range.

Here and there, from Greenland fjord to lonely Kerguelen, the services are combined for many ventures. Air-supplied sledge patrols seek out the wind-driven weather stations, sending out automatically their reports without the need for human supervision. The hidden tank-farm of the trade-route raiders is destroyed.

At sea the carriers are mobile airfields, making quick strikes on distant ports and bases, to starve the submarines and mine their channels. The narrow exits to the wider seas are ceaselessly patrolled and superhuman ears below the surface broadcast the news of submarines which pass. The ships still sail in convoy, for tonnages are far too great ever to move by air. Picquet submarines stand far out to give early warning of air attack. Light carriers sail in the convoys. The merchant ships themselves carry the means of submarine detection, for naval ships are relatively few, submarines swift and convoys too dispersed as air defence, to make a naval screen at head and beam a good protection. Hoverplanes wait on deck to join the hunt when the mechanical sentries give the word, and drop torpedoes with a fine persistence, which probe and listen, listen and follow, no matter how the enemy twists and turns and dives; listen, and follow, and kill.

But in spite of initial air strikes on the one hand and vulnerable sea communications on the other, the process of attrition is inevitable and quickly sets in. This is the longest phase.

At last this mutual consumption begins to show advantage to the ultimate victor, earning the reward of technical superiority. Enemy activity decreases, first in the now unprofitable sea, then in the air. Now his attacks on land begin to lessen. There comes a time when only rulers' fanaticism and peoples' fatalism struggle to carry on. At last the distress of the nation engulfs the government. A new and liberal regime sues for peace, offering unconditional surrender.

Now comes the hardest moment. At this point the victors must ignore their own exhaustion; reject this chance to end the prodigious waste.

The next main phase begins.

REDUCTION TO CHAOS

During this phase the victors' forces are progressively reduced, so that increased peaceful employment can bolster up the tottering economies of their homelands. But war goes on.

The air forces now fly unopposed over enemy territory. No gunfire greets their flight along a ruined city street. No rockets rise to meet them in the stratosphere. They reign in the air from the earth to the highest sky; they dominate in detail all human activity.

Their task is now to cut out from the national structure all that makes it a coherent, complete system. This can be done without further attack directly on the enemy people, and this in turn will help to save the mental balance of the crews for whom this task may seem less clearly necessary. Much will already have gone in the bombardment; the excision must be completed.

No heavy industry; no hydro-electric power. An air force without equipment; an army which must wander back or starve. No transport; no textiles; no radio, no books. Exodus from the towns which cannot be fed; a return to the village and the land.

And now, drought in the corn-land. Disease in the cattle. Increased nomadism and increased pillage. Loss of community and loss of basic knowledge.

BENEVOLENT COLONIZATION

At this point, when the victors' forces are back to peace-time levels, when the control operations over former enemy territory provide no more than training, the last crusade begins.

Into the wide lands, among the peoples old before their time with memories of war, among the ignorant young with memories only of want, the carefully trained ambassadors of peace begin to move. This time they bring no worthless trinkets to exchange for gold, no *racionales* to flog them for their rubber, but drugs for their disease, germ-proofed seed-grain for their land, organization for their chaos and creed-free knowledge for their minds.

Piece by piece, without trace of deprivation or exploitation, the enemy land is assimilated into a more prosperous sphere, and the people are glad to come.

And thus, in time, the democratic federation numbers six hundred million people, whose only arms are centrally controlled; arms for police, no services besides. There is nobody left to fight.

EXEGESIS

The world has struggled to devise some organization which will at once provide for the peaceful resolution of international problems and ensure that a nation discontented with a verdict will not make war to reverse it. Success for this organization would mean an incalculable access to human happiness.

But this organization is hamstrung. It cannot function even in minor conflicts for fear of war between certain large nations. These large nations are few, for they are qualified by special features of economics and population.

These large nations are currently engaged in a cold war, the object of which is the political overthrow of the system of government in use by one group of nations. Democracies are structurally incapable of defending themselves against this form of attack. To survive, they must fight.

War between these large groups would be total war. The aim of the group in which we live would, after self-preservation, be a prevention of recurrence; we have nothing else to gain. All past methods of ensuring peace have failed, and the enemy group may be too large to occupy.

However, aircraft and analogous devices like long-range missiles, newly combined with weapons of mass destruction, at last provide both an efficient way of waging total war and an adequate method of ensuring the peace. For they give us, for the first time, a way of chiselling out those special qualifications of technical capacity, economy or population which a nation must have to fight a major war.

There is, to our British way of thinking, something monstrous in the idea of unleashing so much destruction. We can only hope that the pressure of opinion shown in UNO, or some other civil device, will put an end to the cold war, and save the hot.

But they may not, and we in the services must prepare our minds as well as our technique.

The Provost Branch

By Group Captain C. R. Richdale, C.B.E.

THE Provost Branch is a power to be reckoned with. It is in existence to prevent crime and to help the Royal Air Force to keep a clean and healthy service. It is designed to assist Commanding Officers with their disciplinary troubles, but as a doctor is unable to do much for a dying man, so the Police hope to be told, or discover for themselves, the first signs of disciplinary sickness.

To prevent it spreading or becoming virulent there is the man in blue with a prominent white cap cover and a red and black brassard—the Royal Air Force Policeman. His is the task of maintaining the health of discipline in the Air Force.

So that this may be more fully appreciated than it is at present, I propose to describe on general lines the work that is now being done by the Royal Air Force Police, and, in briefer form, that which was done during the recent war years. Both then and now our commitments have been many and varied; they have also been arduous. So often they have brought the Provost Branch into close contact with the other branches of the R.A.F. and, if the efficiency of the branch is to be at its best, it is essential that the friendly co-operation that has been established should continue.

ORGANIZATION

In an article of this nature it would not be out of place to give a brief outline of how the Provost Branch is established and planned. It is not just a case of saying "with a large organization like the R.A.F. we need a police force. We will have so many people here, so many there." The size of the Branch must be comparable with the job it has to do. In fact, one may well liken the Provost Branch to an insurance premium taken out against probable loss. The premium must bear relation to the value of the property insured and the likelihood of loss. As with certain shipping companies who find it too expensive to insure and prefer to cover the risk themselves, so the Royal Air Force undertakes its own insurance by the maintenance of its own Police Force.

The directional control is in the hands of the Provost Marshal, who is responsible for giving effect to the policy of the Air Ministry. The breakdown of the establishment is first into Commands governing the principal theatres of the world. These, in turn, are split up into districts, each with its own headquarters. On the size of the district depends the number of areas, and on the commitment in each area depends the number of police flights allotted. Thus, wherever the R.A.F. is to be found, so are there police to look after the interests of the Service.

THE INSPECTORATE BRANCH

As the name implies, Inspectorate personnel have much to do with the maintenance of the high standard of example and efficiency that is set within the Branch. Periodically each Station employing R.A.F. policemen is visited by the Inspectorate Officer.

The work done by the policeman thereat is carefully checked. His books and records scrutinized and statistics relating to the Station discipline are examined.

At the conclusion of each visit the inspecting officer will discuss any observations he may have to make with the Station Commander and, if required, tender advice. In this way a close liaison and friendly spirit of understanding and co-operation are built up. Such visits iron out existing difficulties to mutual satisfaction.

The strength and statistical returns which are regularly received show many interesting factors in relation to the increase and decrease of crime. The incidence of the different crimes and offences is carefully recorded and special action is then taken accordingly. The tendency of certain offences to increase is carefully analysed and antidotes recommended. For instance, a shortage of beer will increase the consumption of local and pernicious short drinks with a consequent rise in drunkenness. The antidote in this case would be more beer, with the result that there would be fewer drunks. The airmen appreciate this benefit without realizing the reason for it.

Establishments of Police personnel, no matter into how many classifications their duties may develop, are primarily the responsibility of the Inspectorate department and it is their task to decide how, when and where these establishments shall be adequately manned to meet the always-varying exigencies. Accordingly, the personnel at his disposal will be distributed in the most economical and effective way.

TRAINING

Prevention of crime is the main objective of the policeman. One often hears about the shutting of the stable door after the horse has gone, and in this age-old expression can be found the very basis of his work. This is stressed at every stage of his training, for it is continually being proved that a drop in crime incidence is invariably due to some particularly smart work on the part of a policeman in forestalling intending offenders. In other words, if the stable door is kept locked then no time will have to be spent in searching for the horse.

Not a small consideration in this respect is the assistance which is rendered to Commanding Officers and their staffs. As a result, a Commanding Officer is able to devote most of his time to other administrative, training and operational matters, which are far more important.

Considerable attention is therefore paid to the training of police personnel. The present Police Training School is at Pershore and there, in various phases of instruction, can be found classes covering nearly all aspects of "crime" as it might affect the Royal Air Force. On the staff are competent instructors; many of these have vast civilian experience in addition to police work in the service. For trainees who passed through the School some little time ago there are refresher courses; for those who have proved themselves to be exceptionally capable, there are advanced courses of instruction in the more scientific aids to crime prevention and detection.

Instruction is not limited to lectures. As the training courses progress so the trainee gradually finds himself doing more practical work. Only experience will make a man a good policeman, and that is the reason why so much emphasis is placed on giving a trainee confidence in himself and his ability. The syllabus is not limited solely to police work itself, for it includes instruction in small arms firing and ground combat training.

There are, in fact, such a variety of duties to provide for that it is necessary to divide the Provost Branch into various categories, and although a trainee is first and foremost a policeman, which of the specialist appointments he is subsequently trained for depends, to a great extent, on how he passes his initial course.

Many are attached to R.A.F. stations to gain further experience under capable N.C.Os. Here they gain a closer insight into the activities of the station and are called upon to look after much of the disciplinary side as well as police matters.

Others may be posted to a Provost Flight, the varied duties of which are described later on.

R.A.F. POLICE DOGS

At the R.A.F. Police Dog Depot at Staverton, Alsatian police dogs and their handlers are trained.

In charge of the breeding is one of the most competent judges of dogs in Britain, and, assisting him, a fully qualified staff with years of experience. The dogs and bitches are carefully selected for their intelligence and other qualities and the best are mated together. "Brains" is the keynote of this selection and in a generation or two the Royal Air Force will possess some of the most intelligent and highly trained dogs in the world.

The Alsatian was selected for police work on account of its keen scent, intelligence and the fact that it weighs approximately 75 lb., which weight it uses to full advantage when the occasion necessitates it.

The training of the dogs is not an easy task. It is an exacting job which requires a great deal of patience on the part of the handlers and instructors. Unlike a human being, a dog is unable to differentiate between people being authorized to be present at any one place and any unauthorized persons thereat. Therefore, police dogs can only be used to operate during the silent hours in areas where nobody has the right of entry. Working under these conditions, the dog will not fail, for he instantly recognizes an intruder's presence, and pays no respect to either rank or position. To the dog everybody other than his handler is a potential enemy.

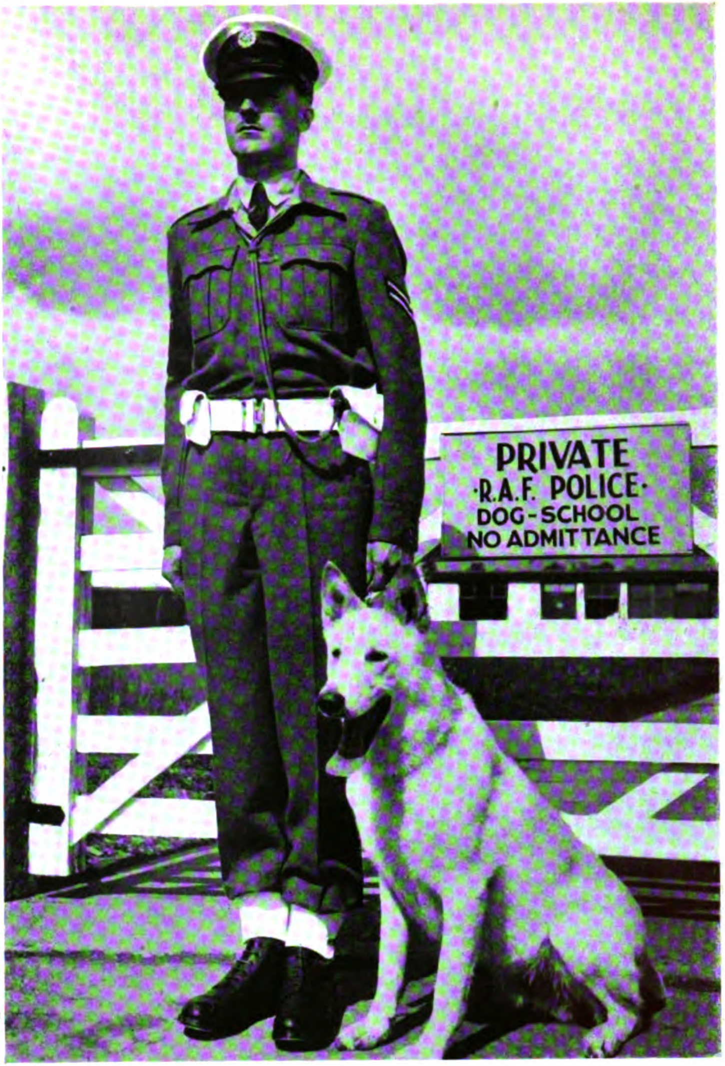
At the school the dog is trained to patrol silently, to detect a human scent and to attack the arm of the intruding person. Furthermore, he is taught not to relinquish his hold until given the appropriate command, while any attempt to attack the handler on the part of the intruder will meet with a hostile reception from the fully trained dog. And it is not until the dogs are so trained that they are sent out on duty.

What a pity a dog cannot read identity cards and operate in crowded areas!

R.A.F. STATIONS—SECURITY

A large proportion of the work of R.A.F. Police is the safeguarding of R.A.F. Stations against the entry of unauthorized persons. While this is essential in this country, it is even more so overseas where attempts are both numerous and daring, in addition to being well planned.

The W.A.A.F. Police
Formed in 1941, the W.A.A.F. was the first Women's Service to have its own Police.



Typical Alsatian Police Dog of the Provost Branch.

The R.A.F. Police, B.A.O.R.

The R.A.F. Mounted Police.

Conditions have changed, and gone are the days when security rested on static guards who were for the greater part men misemployed after doing a full day's work as skilled tradesmen. Security of a modern airfield presents a far more difficult problem today. The greatly increased size of Royal Air Force Stations with their many official entrances and a far greater number of unofficial ones, makes the expense of guarding aerodromes and depots by a static guard quite impracticable. To safeguard such areas by the old-fashioned method would require a small army. Now they are guarded by mobile policemen assisted by police dogs.

The old-time sentry had to strain his eyes and ears for unusual movements, but the trained police dog will detect fresh human scent, according to wind, at anything up to 400 yards, and, equally important, round corners. Having detected unauthorized persons the police dogs can cover ground far more quickly than any human being, and providing that intruders obey the instructions of the policeman they will be unharmed.

Another improvement in the security measures now adopted is the short-wave radio. On large and dispersed aerodromes, particularly in the overseas Commands, invaluable time has been saved and information passed on, inconspicuously, by this means.

SECURITY

Security in a wider sense than that of merely protecting R.A.F. premises and property is also dealt with by a special department within the Branch. It is known as P.M.1 and its task is, in the main, implementing certain aspects of Intelligence (Security) policy as advised by the Assistant Chief of Air Staff (Intelligence).

The external security coverage of the Royal Air Force was first undertaken by the Royal Air Force Police during the last war and is now a regular feature in the everyday work of the Branch. The responsibilities are many, and in order that they may be properly carried out there is close liaison with all allied branches and departments.

The control of air travel from service airfields, the prevention of smuggling and the maintenance of local orders in overseas Commands also come under the ægis of its control. Security staffs also operate at ports and other terminal points on service routes, and in such instances a close relationship with the Customs and Excise authorities is maintained.

During the war the safeguarding of secret operations called for the physical deployment of a considerable number of R.A.F. Police security N.C.Os. This responsibility, too, has remained in peace and calls for the qualities of alertness and patience from officers and N.C.Os. trained and experienced in the work and able to deal with any eventuality which might arise.

The security of an organization as large and as widely spread as the Royal Air Force must necessarily also rely on a considerable amount of documentation and records. There is, therefore, the department known as P.M.5, whose main task is the issuing of all identity cards to R.A.F. personnel and passes and permits to civilians visiting R.A.F. establishments that are protected with security categories A and B.

This department has a close liaison with the National Registration Office and the Criminal Record Office at New Scotland Yard. Carefully filed and indexed, identity records of every officer, airman and airwoman serving in the R.A.F. are maintained complete with photographs. In addition, there is a comprehensive record of every person whether in the service or now in civilian life who has at any time since 1939 been granted a permit or pass by the Air Ministry.

In peace time, most R.A.F. Stations hold no secrets from the public, but at some research and experiments are being carried out and at others the results of similar enterprises are stored. These, necessarily, are protected from the incursion of the man in the street by the system known as "control of entry." Only those with the appropriate pass are allowed in and even then they are only allowed to see or do that which is specifically stated on the pass. Various "forms of entry" are in existence but it is unnecessary to give detailed descriptions of them; suffice to say that the machinery and organization for dealing with all such matters are in full working order.

PROVOST FLIGHT

Perhaps the most varied work, however, is to be found in the Provost Flight. Although there are, of course, routine jobs that have to be done each day, the flight policeman must be prepared for any eventuality, particularly overseas. At home he is generally responsible for the maintenance of discipline of service personnel in towns. In addition, he may be called on for mobile patrols, street and station patrols, the pre-entry vetting of prospective R.A.F. recruits, escorting heavy vehicles and their loads through the principal towns and thoroughfares, and also carrying out of routine inquiries. He will also be called upon to do quite a lot of welfare work, such as giving local advice to airmen in strange towns and on railway stations, on questions of accommodation, etc.

To the policeman overseas, these duties equally apply, but he has, in addition, the extra responsibilities of carrying out anti-vice duties, dealing with armed raids and performing special security patrols and observations in dockyard areas.

The work of an anti-vice Section is more comprehensive than is generally realized. One of their duties is to tour round known brothel areas and places that have been put "Out of Bounds." By doing so, they ensure that the risk of venereal disease infection among service personnel is kept as low as possible. These patrols work in conjunction with the civil police and are, owing to the territory that they have to enter, equipped with light cars or jeeps which have radio contact with the Flight Headquarters. There are many organized brothels overseas and most of them are in the most disreputable areas. Thus, many a person premeditating an indiscretion may be "headed off" in time, or, should the premeditation have become a reality, be ordered to report immediately to his medical officer. These patrols have also the power to arrest known prostitutes in order that they may be medically examined.

In addition, the "anti-vice" policeman also keeps a sharp look-out for overcharging in the local shops and restaurants and is thus helping to prevent service personnel from being fleeced by unprincipled shopkeepers. The sale of illegally distilled liquor and spirits is also within his orbit and his inquiries into this common practice overseas are greatly responsible for reducing the sickness incidence among service men as a result of this dangerous and unscrupulous practice.

Frequently, and particularly in countries where there is considerable political unrest, "informers" bring information that a certain airfield maintenance unit will be raided on a certain night. The attack may be small; it may be unarmed. On the other hand it may be very well organized and its participants heavily armed. Precautionary measures against such exigencies as these become the responsibility of the flight policeman. How the attack is met is the responsibility of the A.P.M. of the area. The raid may not take place, but still the precautions are necessary. Indeed, many times the attack has been avoided by the "leaking" of information that a strong reception will be awaiting the intruders. On other occasions the raid will take place and the raiders be satisfactorily surprised.

Large-scale pilferings at the principal docks overseas is also due to an accumulation of petty thieving and daringly planned raids. That is why the watchful eye of the policeman is operating among the docks both by night and day. He also has the job of assisting the embarking and disembarking of all R.A.F. personnel.

The life of a flight policeman overseas is quite an adventurous one and, in one overseas tour, provides a subject for reminiscence for years to come, and for the youngster a training which stands him in good stead in after years.

Special Investigation Branch

Detection of crime is an absorbing topic. The machinery that can be set in motion when a crime has been committed is both vast and comprehensive and the work frequently entails hours of fruitless endeavour in chasing what eventually prove to be "red herrings." A Station Commander who may be in difficulty can call in the Provost Officer, who, in turn, has the benefit of all the facilities available to police both in and out of the service. These are many and varied and are those which have proved most successful during years of practical experience.

The variety of crime investigated by the Special Investigation Branch is almost endless. Simple larcenies and crime ranging up the scale to manslaughter and murder have all come within their orbit. In the Home Commands certain crimes are ultimately dealt with by the Civil Police, but investigations overseas are, in many countries, carried out to the bitter end by the R.A.F. Police before the accused, if he is a civilian, is handed over to the civilian authorities.

Not every case that is investigated is brought to a successful conclusion. Often, delay in reporting the offence gives the culprit time to cover up his tracks sufficiently to avoid a conviction. An example of this is shown on a current year's file. Five months after a car was stolen from an R.A.F. Station the matter was reported to the police. Inquiries showed that two airmen who were on the Station at the time of the theft had been posted to A.C.F.E. They were eventually located, interviewed and statements obtained. Other airmen on the Station had been posted to Stations throughout the United Kingdom and had to be traced and interviewed. In addition, statements were taken from the M.T. Officer and other officers. But, despite all the inquiries and investigations, evidence strong enough to gain a conviction was lacking, solely because of the delay in reporting the offence.

Fortunately, not many investigations have this unhappy ending. Another interesting case on record shows how a comparatively minor offence can lead to the unearthing of crime on an extremely large scale. The opening information was that £10 had been received for the unlawful disposal of goods from a Maintenance Unit. Observations were carried out and the accused was eventually charged with the larceny of timber and other small amounts of property. As a result of further inquiries, other stolen property was recovered and a number of civilians and airmen were charged. Six service personnel and nine civilians were subsequently charged, and of these twelve were convicted and awarded sentences ranging up to three years' penal servitude. But this was not the end of the case. Arising from the above a further two airmen and two civilians were charged and convicted of stealing other valuable equipment.

The whole of the above was brought to light solely by the investigation of what was originally thought to be a single offence.

Of great assistance in carrying out these investigations is the Criminal Record Office at the Air Ministry. Here detailed records of crime committed by R.A.F. and W.A.A.F. personnel throughout the world are recorded. There is also a *modus-operandi* crime index which sets out in detail all the data likely to be of use at any future date in the investigation of offences. All identifiable lost and stolen property is listed and circulated to the various departments in service and civilian walks of life that may be able to lead to its recovery. Not the least important factor of this office is the close liaison which it maintains with the Criminal Record Office at New Scotland Yard and, if the circumstances warrant it, the record offices of foreign countries, when working with the civil police.

Also controlled by the Special Investigation Branch is the Absentees and Deserters Section. This department is responsible for the collation of all information concerning absentees and deserters throughout the world, and, during the past twelve months alone, it has closed 3,329 cases. Liaison is maintained between the R.A.F. Police Districts, R.A.F. Record Offices, Air Ministry and the Civil Police, and much of the information obtained is of benefit to all the foregoing.

This department also issues photographs of wanted persons at the rate of more than 2,000 a year, advises Scotland Yard of absentees for publication in the *Police Gazette*, publishes its own *R.A.F. Police Gazette* and keeps in touch with the Central National Registration Office.

Operational Absentee and Deserter Sections function in all districts in the United Kingdom. Records show that by concentrating on the question of absentees from the R.A.F. much potential crime is stopped at the source by preventing the absence extending to a point where an absentee may become desperate.

Low Flying

Low-flying offences also come within the jurisdiction of the R.A.F. Provost Branch and are dealt with by a small department at the Air Ministry.

The function of this department is primarily to investigate breaches of flying regulations committed out of station boundaries. On the other hand, many other peculiar cases are investigated such as "peculiar noises," damage to livestock and houses, and the pacifying of public bodies who may object to R.A.F. aircraft training over the areas they control. The department also deals with the authorization of low-flying areas and routes.

Over a period no fewer than 376 complaints were received, and of these twenty-six were found to be unjustified. Only 100 of these complaints were of a nature warranting disciplinary action and successful proceedings were instituted against forty aircrew.

In addition to instituting court-martial proceedings, an officer from this department visits the Chief Constable in every area in which a case occurs, thereby maintaining a high level of liaison with civil authorities.

The job in itself is no sinecure, for all parties are usually both irritated and biased, and the information given is frequently no more than "an aeroplane flew low over my house last night." Hence the detailed investigation required.

W.A.A.F. Police

An account of the Provost Branch would be incomplete without a brief reference to W.A.A.F. Police. Formed in 1941, the W.A.A.F. was the first women's service to have its own police. Since that date the duties have considerably increased, with the result that today their work is on a par with that of the R.A.F. policeman.

At the Training School the policewoman and the policeman attend courses side by side. Instruction is the same, no matter what the sex. There are, of course, dividing limits as to the powers and practical work of the policeman and woman, but to all intents and purposes they are part of the same Branch with the same interest, namely, that of preventing crime, and with the welfare of service personnel well at heart.

Without the W.A.A.F. Police the R.A.F. would be severely handicapped; with them there is no gap in police efficiency.

More than this short description is unnecessary and would be duplication of most of the foregoing.

IN CONCLUSION

It will be readily appreciated that the foregoing is only an outline of the activities of the Provost Branch, and in places where the reader might be hoping to hear matters of absorbing interest he must have been somewhat disappointed by the absence of detail. It would not be in the public or service interests to enter into details of the S.I.B. and service methods of detection of crime or the system of maintaining security in its wider sense.

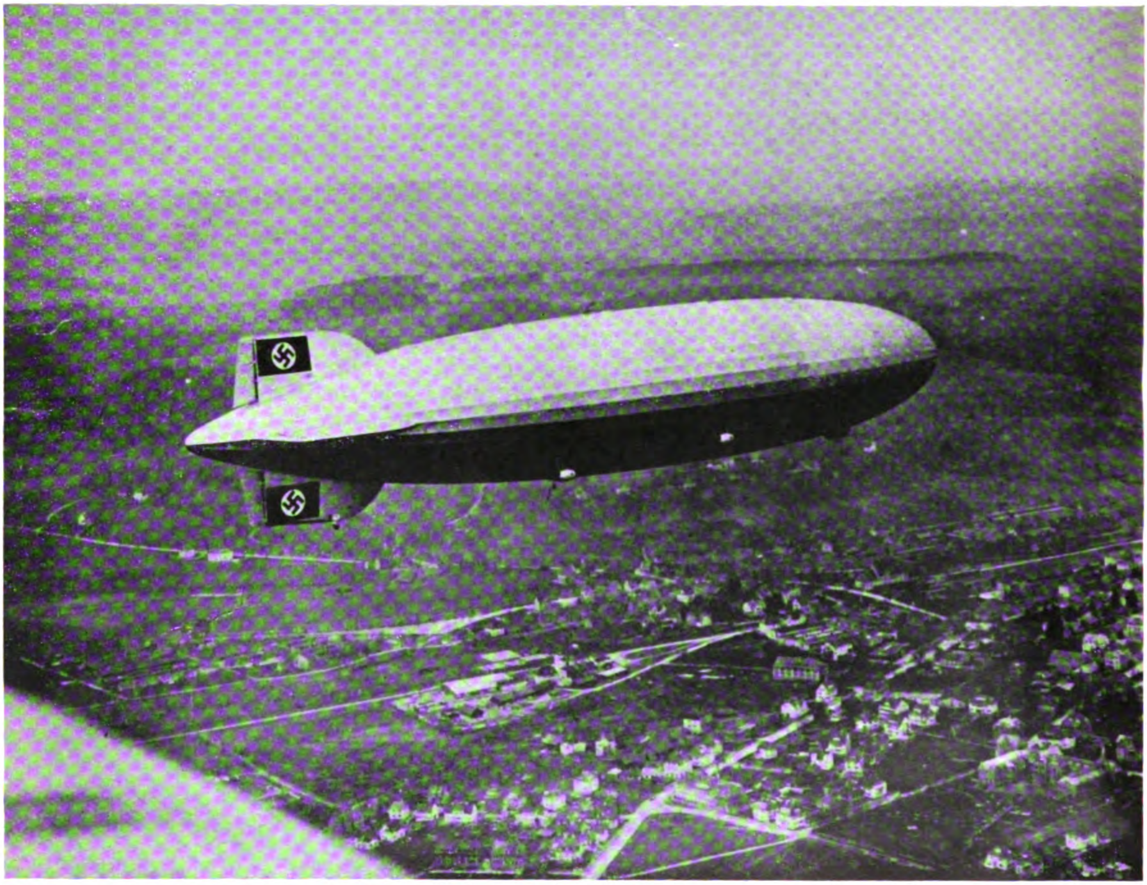
Nevertheless, it is hoped that sufficient has been recounted of the life of our R.A.F. Police to establish the vital part they play in maintaining the very high standard of discipline and security of the Royal Air Force.

The problems of Air Defence against "Rocket Attack" will not remain static. They may recur in new forms in the future. The scientific advances which the Germans used so spectacularly, if unsuccessfully, gave us a foretaste of hazards against which it is our business to provide. As science goes forward, and fresh discoveries lead to changes in the apparatus and methods of Air Defence, fertility in research and skill in engineering will provide better tools and weapons; but these are only raw materials of progress. What we need to do, above all, is to give rein to the qualities of mind and imagination which can take the growing mass of technical knowledge and mould what it brings forth to fit the shape of the things to come.

—From Despatch by Air Chief Marshal Sir Roderic M. Hill, K.C.B., M.C., A.F.C., on Air Operation by Air Defence of Great Britain and Fighter Command in connection with the German flying bomb and rocket offensive, 1944-45.

Anti-Vice N.C.Os. about to enter a typical brothel.

Face page 20



The "Hindenburg" Zeppelin which averaged ninety per cent. bookings of her seventy-two seats on her journeys across the Atlantic.

Will the Airship Return?

By A. J. Huxley

THE heavy financial losses that continue to be incurred by British and many foreign airlines—including American companies with the most up-to-date equipment—have made many experts urge the revival of the airship. They believe that lighter-than-air craft can be both the cheapest and the safest form of air transport. It is perhaps surprising to recall that before the war commercial airships made a profit; moreover, they had only one serious accident, compared with the continuous record of aeroplane disasters.

The airship is a displacement craft, like the seagoing vessel, which it resembles more than it does the aeroplane; and it should be dissociated from the latter and allowed to stand in a class of its own. In the past it has not only proved its commercial worth, but has been valuable for aerial survey, charting, photography and exploration, rescue and police operations; during the war, U.S. Navy "blimps" made 55,900 operational flights of nine to ten hours' average duration on anti-submarine patrols, convoy protection, mine spotting, and rescue work.

The airship has a far larger lifting capacity than the aeroplane, and this can be used either for large payload or long range. This buoyancy is obtained from hydrogen or helium gas. Hydrogen is readily produced and is lighter, but has been responsible for too many disasters for continued use; natural helium, however, occurs in useful quantity only in the U.S.A. and the U.S.S.R. (Siberia). Any attempts to revive airships in Britain will depend on America's willingness to sell helium, and will involve the costly transportation of the gas to Britain. It is feasible that helium may in time be produced by an atom-splitting process.

The modern airship, with cruising speed of at least 75 m.p.h., would be three or four times faster than an ocean-going liner and about a quarter as fast as a modern aeroplane such as the Constellation. On the 2,000-mile flight between Britain and Newfoundland on the North Atlantic route, for instance, the aeroplane would cross in ten hours and the airship in twenty-five; the *Queen Elizabeth* takes four days. But the prevailing westerly winds over the Atlantic would place the airship at a disadvantage. A 20-m.p.h. wind is often met and would increase the airship's time to thirty-three hours, the aeroplane's to eleven; the maximum likely wind of around 45 m.p.h. would set the airship back to fifty-seven hours and the aeroplane to thirteen. Even so, remember that the airship would fly to North America in one "hop," while the aeroplane takes three; and delays to the airship while crossing would often balance out against delays to aeroplanes grounded by the weather. Moreover, the airship has a large enough fuel reserve to navigate around bad weather.

No advertised Zeppelin flight was ever cancelled, or turned back by weather or any other cause. Today, with improved mooring masts and modern instruments such as auto-pilots, radio altimeters, and radar navigation and landing aids, airships should be 100 per cent. safe in any weather. In fog they can come in slowly and wait, while the aeroplane must land and at its usual speed. If engine failure occurs the airship can remain in the air while repairs are effected—the *Hindenburg* once had temporary engine failure in a storm and none of the passengers realized it—or if unrepairable it can radio for help and descend gradually to ground or sea level. It can ride out storms up to 100 m.p.h. on its mooring mast, and greater winds at altitude.

There is ample room in airships, including space for private cabins, lounges, dining rooms, observation galleries. There is little noise or vibration, and air-sickness does not assail the passengers. The airship's popularity is shown by the bookings on the *Hindenburg*, which averaged 90 per cent. of the seventy-two seats. Large spaces are available within the envelope for freight stowage, particularly valuable for bulky cargo of low density or difficult shape.

Among the airship's disadvantages are its need for immense maintenance hangars and the difficulties of manœuvring in and out of these in side winds. But these manœuvres and normal landing can be facilitated by the use of tracked vehicles and the cost of these, hangars and mooring masts, is far less than for the long multiple runways required by aeroplanes; the landing area can be far smaller, and neither does the airship have a cumbersome undercarriage and the aeroplane's comparative danger in landing.

Airships have a remarkable safety record. There have been accidents, but all but one were to military or experimental ships. The one accident on a scheduled flight was that to the *Hindenburg*, which caught fire while mooring at Lakehurst, N.Y., in May, 1937, when thirteen passengers and twenty-three crew were killed out of ninety-seven on board. This accident could not have occurred to a helium-filled airship. But up to 1937 the *Hindenburg*, *Graf Zeppelin*, and a few smaller airships in Europe had carried 51,847 passengers over 1,403,000 miles without any incident—a record unparalleled by aeroplanes—including more than a million miles over the Atlantic route.

Ranges of over 3,000 miles particularly suit the airship, which is capable of long non-stop flights; the longer the flight the lower the cost per mile. A small non-rigid Goodyear airship recently made a record powered flight of 7 days 2¼ hours without refuelling.

Since the last commercial airship was built before the war there have been great advances in engines, airscrews, instruments, structural methods, light alloys, plastic fabrics, and so on, which could all be combined to produce airships of greater speed and weight-lifting capacity and complete safety and reliability.

The biggest post-war airship project is a $375,000 contract awarded in September by the U.S. Navy to the American Goodyear Corporation, for the design of a long-range ocean and polar patrol blimp. Powered by two 800-h.p. Cyclone engines, each able to drive one or both of the 18-ft. propellors, the craft will have a crew of fourteen, and tricycle landing gear retracting into the double-deck gondola, 87 ft. long. The overall length of the blimp will be 324 ft., and its capacity 825,000 cubic ft. of helium. It will be covered with rayon coated with synthetic rubber.

The Goodyear Corporation are also planning a commercial airship 950 ft. long, with six 1,050-h.p. engines, to fly an operational range of 7,000 miles (maximum 11,000 miles) at cruising and maximum speeds of 75 and 90 m.p.h. respectively. Later, gas turbine engines will be experimented with. It will have interchangeable passenger and cargo units, and will carry 112 passengers "de luxe," with 63 sq. ft. of space each, including individual cabins and all amenities, or 230 passengers with 25 sq. ft. apiece. For short trips it could accommodate 300 passengers, still with more comfort than in an aeroplane. Fares will be about 3d. a mile. The crew would number 60, including catering staff.

Alternatively it will carry 180,000 lb. (80 tons) of freight over 7,000 miles; compare the modern aircraft's payload of perhaps 8,000 lb. over 3,000 miles.

So that the airship will not have to moor at intermediate pick-up points it is to carry a 14-passenger aeroplane as "picket-boat." Successful experiments in operating aeroplanes from airships were made before the war.

The cost of such a craft would depend on the number built: if six were ordered it is estimated at about £2 million each. Production of the first would take about two years, the remainder following at six-month intervals. The Goodyear company have considerable backing in this venture, and hope to begin construction when their factories have completed present commitments.

The only other country apparently interested in airships is the U.S.S.R., where it has been reported that construction is under way, possibly on polar blimps. The Russians became interested in dirigibles in 1937, when they investigated all information available in America and Germany, and even wanted to purchase the wreckage of the *Hindenburg*.

And so it seems possible that we may again see the long, silvery shapes of airships in the skies—a method of transport, to quote Lord Ventry, British lighter-than-air advocate, "unbeatable for comfortable, safe, and economical long-distance flying."

WILL HISTORY REPEAT ITSELF?

In 1588, when England was threatened with invasion by a Sea Armada, Queen Elizabeth at Tilbury stirred the men of this country into action.

Without doubt we are today overshadowed by the fear of invasion, this time by an Air Armada. To whom can we look to rouse the whole nation from this apathy, that we may speedily prepare once again to defend our country?

The Influence of Modern Techniques of War on Strategy

By "Aquila"

Part I

Historical Conceptions of Strategy

Introduction

FOR some time I have shared with my colleagues a feeling that our definitions of various terms used in the realm of our thoughts on strategy need elucidation. If we are to indulge in abstract discussion on war, it is important to know as nearly as possible the value of the terms we use, and this can only be established by a common understanding of the facts involved and the aims which we are seeking to achieve.

It seems to me to be a matter of particular importance that we should be able to apply the systems of thought adopted by the many great historical writers on the art and science of war to our own times. I hope, therefore, to show how the system of thought represented by these historical writers might be extended to apply to modern war with all the complexity of the new techniques which have been developed. It will be necessary to investigate the effect of these new techniques upon our traditional conceptions of strategy and to see whether any changes are necessary either in the conceptions themselves or in the use of particular terms coined to embrace them.

In setting about such a task I shall outline the sources of many definitions with a view to giving them a more calculable value, and will then review them in the light of our latest knowledge of war and strategy at its various levels. In so doing it will be my purpose to deal dispassionately with the influence of new techniques. My aim is to establish a true perspective in these matters which will serve to focus the ideas of all services upon the proper use of all the techniques of war in pursuit of our national aims.

A Definition of Strategy

"The term (strategy) in its literal and original sense means 'the art of the general.' But no military term, perhaps no technical term of any kind, has undergone more changes of meaning, suffered more attempts to reach a standard definition, or been more diversely interpreted. And rarely has the difficulty of definition had such an effect on the course of history. For the vagueness which has surrounded the term has influenced the issue of wars and the destiny of nations by encouraging doubt and dissension as to the respective spheres of the military command and the government in time of war. . . ." (B. H. L. H., in the *Encyclopædia Britannica.*)

This may, indeed, be true, and it is certainly not my intention to attempt to make too rigid an interpretation of a term which has been popularly coined to cover a rather nebulous range of thought and activity. From a study of history, however, it is reasonable to define the broad realms in which the term "strategy" has been applied, and which have normally been accepted by military historians.

It has been said by Clausewitz that the conduct of war is the "use of the prepared means adapted to the most special requirements." The relations of the material things, the prepared means, are simple, but the right comprehension of the moral forces which come into play, and the hazards and opportunities of war is more difficult. Thus, turning a flank has been done a thousand times, and yet may still be regarded as the proof of genius. For, "in strategy everything is very simple, but not on that account very easy."

Whereas the original meaning of the word strategy confined it to the "art of the general," it has been borrowed to apply to a government's war policy. In this case the "use of the prepared means adapted to the most special requirements" involves the co-ordination of the political, economic and fighting means at the disposal of the government. This is defined as "grand strategy."

Strategy is a process of relating the means to the end, and there is little room in the circumstances of war for scientific formulæ designed to give a rule-of-thumb answer to strategic problems. However, the principles of war are as valid in the realm of strategy as of tactics. For the rest Clausewitz exclaims: "Pity the warrior who is contented to crawl about in his beggardom of rules."

The following definitions may help to clear our minds as to the various levels at which the word strategy has been accepted historically in political and military thought.

Grand Strategy. "The direction and management of war." It is synonymous with the government's war policy, "and broadly falls into three categories: political; moral and material; naval, military and aerial." (Bird.)

Military Strategy. Lies between the province of the government's war policy and tactics. Von der Golz defines it as "the broad measures which have for their object to enable troops to enter on the decisive struggle under the most favourable conditions." Clausewitz's definition is, ". . . the employment of the battle to gain the end of the war," and "it makes the plans for the separate campaigns and regulates the combats to be fought in each." During the 17th and 18th centuries this realm of thought and planning was embraced by the term "grand tactics."

Beneath these levels of national and service strategy lies the realm of tactics. To take a further definition, that of Hamley: "The theatre of war is the province of strategy; the field of battle is the province of tactics."

The Aim in War

The strongest human instinct is that of self-preservation. It has influenced the formation of society from the earliest times, causing families to unite within the stronger defensive framework of the tribe, and tribes to come together in nations. Indeed, the collective security derived from national cohesion is the foundation stone upon which the political, economic and military organization of a country is built.

War is a continuation of foreign policy. For us it is the last resort of national policy as a result of a threat to the Commonwealth's security, or in fulfilment of a covenant to which it is party. Once war has been joined, the Commonwealth aim will be to impose our will upon the enemy as soon as possible. Broadly, there will be two aspects in our warlike endeavours, defensive and offensive. In our particular position we might tabulate our warlike aims as follows:

(*a*) To maintain the integrity of our Commonwealth peoples and territories.

(*b*) To secure the sources of our Commonwealth war potential.

(*c*) To develop the offensive action by which alone the enemy may be overwhelmed.

The strength of the Commonwealth is widely dispersed, but its most vital territory is Britain herself. This is on account of the large proportion of the population which is to be found there, and the even greater proportion of industrial output of which she is capable. Moreover, she is situated more closely to our potential enemies. As a result Britain must inevitably be the main base of Commonwealth operations, and at the same time she is the most difficult portion of the Commonwealth to defend. Unless we have strong allies it is probably still true to say that without Britain the Commonwealth is fatally weakened, whereas it might be possible for the Commonwealth as a whole to survive a war in certain circumstances if one or other smaller portion of the Commonwealth was temporarily overrun by the enemy.

However, Britain has long been an industrial nation, which is dependent upon the many areas in the world from which she draws her raw materials. No nation is as dependent upon trade for its very survival, not only in war-making materials but also in food for the people. Thus the defence of Britain involves also the defence of many outlying territories covering the Far East, Middle East, Africa and the West Indies. Not only this but she is as dependent upon the friendship of other nations for vital commodities. Thus, the security of the Commonwealth is intimately bound up with her relations with many other nations. These problems lie in the sphere of foreign policy. In order to derive the benefit of the materials which she draws from these many diverse parts of the world, she must see to it that her lines of communication across the sea are secured. We have, therefore, a far-reaching and complex problem in assuring the security of our main base.

No war can be won decisively except by taking the offensive. Assuming, therefore, that our aim cannot be achieved by the limited objective of maintaining our defensive integrity, we must look to the means of prosecuting the offensive against our enemy. This may require the establishment of military bases and the joint effort of all our war-making potential. Our defensive requirement for securing the freedom of the seas, has also given us in the past a most potent means by which to develop our offensive against our enemies, especially if they have been seaboard nations. Thus blockade by sea has hitherto been our main offensive weapon.

Major Influences on Strategy

The major influences upon strategy may perhaps be summed up under the two broad headings of geography and the population of any particular area.

Any nation whose land frontiers adjoin those of another power must maintain the land forces required to defend it. Any country which borders on the sea alone must trust to the sea for its security. Where a nation's war potential depends upon sources of supply beyond its immediate territory, it will wish to control the communications to them. Where these communications are overland, there will evidently be a desire to extend the means of controlling these communications into the territory of another, and this will give rise to conflict. Where these communications are by sea, no such conflict will necessarily arise, for there will be no encroachment upon the sovereign territory of another nation.

The shape of frontiers will give certain advantages to the one or other nation. Where the frontier forms a salient into another's territory, the one nation may be able to divide the armies on the frontier of another. And on the other hand, where there is a re-entrant, a nation may be able to squeeze out or cut off the army of the other. Seaboard nations will have to rely upon their command of the sea for defence, but if they cannot do this then the shape and length of their coast will influence the effectiveness of their defences. For a long coast without harbours will be difficult to defend and will require large and dispersed forces.

The position of one country in relation to another and its vital trade routes will also influence the strategic integrity of a nation. For instance, a nation which commands the passes through a range of mountains will be able to take toll from international traders, and will be well situated to cut off the essential supplies of another in time of war. The nation which had command of Petra or Palmyra was in such a powerful position. At sea, the nation which controlled the straits was in a similarly powerful position. Moreover, a nation which can work along internal lines of communication can speedily effect concentration, while the nation working along external communications is at a disadvantage. On the other hand, provided a nation retains command of the sea, it may be an advantage to work on external communications, for by threatening a long coastline, the nation with internal communications may be forced to disperse its defences around its perimeter, while the other may threaten its coast where it wills.

It is clear that nations which are on opposite sides of a common enemy may be defeated in detail. A nation holding a central position may, on the other hand, force the enemy to split his forces. For instance, the position of Britain allows her to split the seapower of the Continent by denying the passage of the Channel. By our position at Gibraltar, the seapower of Spain is split, and this is also true of France. The possession of Malta allows the Italian seapower to be split. The seapower of Russia may also be divided between the east and the west.

Mountains, rivers, sheltered waters and the extent of a territory will all have their bearing on the strategic position of a country. In particular, today, depth of territory is important for the deployment of air forces and organization of effective air defence. In Russia it was largely the vastness of her territories and the weather which brought defeat upon both Napoleon and Hitler.

Another major influence upon strategy is the character and number of a people. If there are large numbers of agricultural people of indifferent industrial skill, then the strategy which that nation must adopt will tend to depend on mass tactics and the absorption capacity of her great territories. On the other hand a small highly industrialized nation will depend more upon technical methods of war. A nation which depends upon the sea for its trade and defence will have large reserves of maritime people and shipping, and the ability and means to construct and the skill to handle ships. Few countries can hope to depend as much upon the air for trade as they have upon the sea, but those who by distance and commitment are most encouraged to take to the air will build up a reserve of industrial skill which will prove a strategic factor in time of war.

A people which trades and colonizes will find it easier to maintain the integrity of its communications and the cohesion necessary for the development of its war potential than a people which pillages its neighbours and robs the weak. This is a strength which may be noticed in the character of the English, and may be contrasted with the colonizing methods of the Spanish. Thus, the honesty and fair-mindedness of a people will build a sense of confidence and mutual benefit which will become of strategic importance in maintaining the security of sources of supply.

Depending upon the particular situation in which a country may be placed, the government should appreciate the vital means by which its defences can be assured. It should then encourage the peace-time pursuits of the nation in such a way that in war they may prove a source of strength. In highly developed civilizations it will be essential to maintain certain forms of industry; in continental powers the emphasis will be upon the needs of armies; in seaboard nations the emphasis may be on navies; and today it may be that governments should pay particular attention to the aircraft industry and the training of its man power.

Techniques of War

Throughout history there has been a constant development in the instruments of war, each giving rise to new strategies and tactics. The disadvantages of the Greek phalanx and its "hedge of spears," gave rise to the more open order of the Roman legion. This allowed greater mobility and, in particular, the legion could change direction at short notice to face a flank attack. It was largely the influence of the foreign elements in the Roman army which caused the development of cavalry. Indeed, this highly mobile force was even used to the exclusion of infantry altogether at Tricameron (535 B.C.), where Belisarius defeated the Vandals in North Africa. Later during the dark and middle ages the cavalry arm continued to be the predominant weapon of war. During the Crusades the heavy mailed cavalry of the West was no match for the light and swifter cavalry of the Turks armed with bows. As a result the ruling notion amongst the commanders of the West was to allow the light forces to become engaged and then to destroy them by superior weight and weapons before they could extricate themselves. During the campaigns of Edward III, the Black Prince and Henry V in France, the English were equipped with the longbow, which proved a decisive weapon. However, their tactics were defensive, and they formed up their position and awaited the enemy's attack. At Crécy, Poitiers and Agincourt, the heavily armoured French cavalry dismounted and attacked on foot, thereby dispensing with their qualities of speed and mobility. By the time they had reached the English lines they were out of breath and easily defeated. Once again the infantry became the centre of gravity of a battle, and the cavalry was used to overrun the enemy flank when he became inextricably committed. The development of the cannon and, later, the musket put further restrictions upon the employment of cavalry. However, they were used to deliver the *coup de grâce* throughout the days of Marlborough and Frederick, and no less during the Napoleonic wars a century later.

In recent times the development of the machine gun created a formidable problem for the infantry, and this gave rise to the tank. The technique of war on land has swayed back and forth . . . now using this weapon, and now that, but invariably the right use has proved to be a careful combination of all weapons.

At sea, fighting took place during Roman times either by ramming or boarding. It was largely a matter of fighting a land battle with soldiers at sea. It was not until Henry VIII ordered guns to be placed in his ships that fleet actions in anything approaching the more recent sense took place. Throughout the Spanish, Dutch and French wars from the sixteenth century until the introduction of the dreadnought, naval warfare became highly developed, especially by England. The idea of fighting a naval action at gun range was adopted by Drake against the Spaniards, who still thought of naval warfare in terms of a land battle at sea. By Nelson's day the technique was perfected. With the introduction of steam and armour, naval tactics underwent many changes, until during this century we have seen great fleets composed of battleships, cruisers and destroyers.

Early in the century, the submarine was introduced and this enabled a power, which was not strong enough to command the seas as of old, to conduct a *guerre de course* against our vital lines of communication. Their operations could be carried on in widely dispersed areas and there was little answer except to remain on the defensive. In fact it was a covert form of warfare, in which the initiative lay inherently with the submarine. The latest weapon to be introduced into sea warfare is the aircraft carrier, which has the dual role of commanding the airspace over the fleet or shipping at sea, and of extending the range and hitting power of the navy. In effect, anything in the nature of main fleet actions may now be deemed to be miniature air battles using advanced seagoing airfields.

In the air, balloons were first used in the American civil war and by ourselves in South Africa. Serious aviation was not developed until the first world war, when it began as an adjunct to armies and navies, largely for reconnaissance. As the range of aircraft was increased, and as they were equipped with weapons and bombs, so fighting in the air, initially in the quest for reconnaissance information, and bombing operations came into being. During the late war we have seen the great air armadas over Europe, and we have seen air power developed to a point where it has become the first line of defence of our country.

The man and all that implies is common to the use of all techniques of war, as indeed are the precepts of strategy. It is noticeable throughout the history of war that as one or other technique is developed, so there is a tendency to rely overmuch upon it for a period until it finally finds its level as an efficient complement to other techniques. For instance, the cavalry were used in many different fashions . . . as a fluid force operating around a stable infantry pivot, by themselves, and dismounted as heavily armoured infantrymen and so forth, but finally their use became stabilized as a proper complement to infantry and artillery. We have seen very much the same process at work in the use of tanks during our own time.

At sea we have seen a somewhat similar development in the use of various fleet units, including today the submarine and the aircraft carrier. It is largely a question of gauging the capabilities and limitations of each weapon and finding a compromise which will most effectively achieve the aim at any particular moment.

Thus, when we come to aircraft we find that their capabilities are potentially very far-reaching, and it is difficult to bring about a compromise in pursuit of the former aims of sea and land warfare which does not at the same time set limits upon some of the most important potentialities of this weapon. In this case the range alone extends so far beyond the arena of surface combat that the major part of war in the air is conducted in a separate arena of operations. At the same time the evident advantages of these weapons on the surface battle arena make them an essential ingredient in all surface warfare. By character, however, the potentialities of aircraft, great as they may be, are least effectively employed on battlefields or against small targets. This is largely due to the inherent inaccuracy of bombing and the difficulties of locating small and dispersed targets. Moreover, the destructive capacity of the most powerful aircraft weapons is largely wasted against such targets on a battlefield. It is a matter of reconciling the capabilities of these new weapons to the possible tasks open to them in the prosecution of war. As a result of their main virtue of ubiquitous movement over land and sea, their great range and the destructive power of the weapons they carry, they can be used more effectively beyond the sphere of former battlefields. And so it is that their operations have become a part of the higher aims of war. Once again, however, it is important not to lose sight of the lessons of history. We must ensure that air operations are most effectively co-ordinated with the employment of all our fighting potential including our surface forces, even though this coordination may not necessarily be upon the immediate battlefield. In view of the recent development of weapons of mass destruction, the use of air forces in the realm of the higher aims of war is likely to become of very great importance to a nation. The tactical and technical limitations of aircraft suggest that air warfare is unlikely to supersede other forms of warfare altogether, but it is probable that it will become increasingly the main instrument of national defence and offence.

Abstract Elements of War

There is no human characteristic which does not find the fullest scope for expression in the realm of strategy. There is no combination of elements or factors to be met in the course of worldly existence which does not find its place in the realm of strategy. Strategy cannot be learnt from books for it is the whole span of mortal life and circumstances itself. Like nature, it conforms to no rules of man's making but only those inherent in life itself. Thus historical writers and strategists of the past have attempted to crystallize their thoughts on strategy and have drawn up a list of the so-called immutable principles of war. They are rather pivots around which the thoughts may revolve with whatever freedom of action they will.

Whatever examples we may discuss in amplification of the principles of war, they will inevitably be drawn at random from Pandora's box. Considering the enemy, a commander will seek to strike at the mental equilibrium of his opponent, and play upon his fears and difficulties. He will compel him to blunder and take advantage of his mistakes. He will mystify him and lure him into a false position. He will induce him to divide and deal with him in detail. Considering his own forces, the commander will seek to concentrate superior force and strike where least expected. He will not fight except on his own terms. He will at all times be vigilant and never lose an opportunity. He will make up in activity what his forces lack in strength. Considering his methods, the commander must conserve his breadth of view and see in every circumstance the embryo of a new stratagem. He will make play with the complementary means of surprise and concealment, and will spread false rumours to cover his secret designs. He must avail himself of all possible intelligence and trade upon the character and situation of the enemy. He will never allow the enemy respite, and will maintain a continuing threat to his supply lines and his base. On the other hand, he will show patience while his stratagems mature.

The commander will combine the one degree of this element with another of that, and, selecting the time and place, will assemble them with all the forces of nature, chance, circumstance and the material and moral parts of war, to achieve his aim. These are the precepts of the strategist and they have been expressed as the well-known principles of war. They contribute to Napoleon's central conception of war . . . "to multiply mass by velocity." There is little room for mathematical formula in this realm of thought and action . . . all depends upon the judgment and resolution of the commander.

And thus we come to consider amongst the abstract elements of strategy and character, personality and intellect of the commander. For it is by his prescience, will-power and activity that all these elements can be attuned to each other. By combining them Belisarius won a bloodless victory over Chosroes, the Persian King, at Carchemish on the upper Euphrates. With less than 20,000 men, he forced an army of over 200,000 men to withdraw. The Fabian strategy which led to the Battle of Zama was decisive in achieving the aim of ridding all Italy of Hannibal. Again and again throughout European history there are examples where small and well-handled forces outwitted the greater forces of the enemy owing to the superior combination of these elements. As we have seen in medieval times, the smaller British forces overcame the feudal armies of the French by the superior use of their bowmen, while the French misemployed their heavily armoured chivalry as infantrymen. These moral and material values, the cause and effect, can only be learnt by war. But the most potent stimulus to thought and understanding of them in preparation for war is the study of the lives of great commanders and the histories of wars . . . from the ancients down to the campaigns of Cromwell, Marlborough, Frederick, Napoleon and the greater wars of more recent times. Cromwell fought at Dunbar because he knew that these elements combined in his favour. Blenheim is an example where the prescience and confidence of Marlborough gained the initiative over superior French forces. Frederick relied, perhaps more than any other commander, upon the intrinsic fighting qualities of his soldiers, which were sharpened under his stern disciplinary system. Again and again Napoleon divided his enemies and defeated them in detail.

There is little purpose in attempting to analyse further the qualities of the great commanders, except to say that they were all men whose minds were masters of their hearts. The commander cannot afford to be other than entirely impersonal and dispassionate in his judgment. He must comprehend the full range of human characteristics, and be able to dominate every problem, both the simplest and most complex matters of human behaviour, both the smallest details in the military art and the greatest enterprises of war. And at the decisive moment he must dare . . . "to put it to the touch, to gain or lose it all!"

Some Historical Examples

Since there are no set rules to strategy, except for the principles of war which can be used to test the validity of a particular strategy, certain broad notions concerning forms of strategy have grown up in history. In considering these notions it is important at all times to hold steadfastly before us the aim which the commander has set for himself. It is very often the magnitude or the limitation of the aim which sets the level of strategic argument in which we may find ourselves. Some of these broad conceptions are discussed below.

Periclean Strategy. After the battles of Marathon and Salamis the Persians were successfully thrown back and the city state of Athens gained an ascendancy in Greece. During the subsequent Peloponnesian War (431-404 B.C.) Sparta invaded Athens with a strong army. However, Pericles, the Athenian general, refused battle on land and adopted a strategy intended to wear down the power of Sparta by powerful raids, using the superior Athenian navy. It is a conception of war at the level of government war policy which might well have been applied to the tactics of Elizabeth against Philip of Spain before the Armada. The aim was to reduce the power of the enemy until he became convinced that he would not win a decisive victory, and thereby ensure the security of the state.

Fabian Strategy. After Hannibal had completed his famous march into Italy across the Alps in spite of the efforts of the elder Scipio, his son Fabius proposed a new strategy to force Hannibal to leave Italy and thereby secure Roman territory. He knew that Hannibal was too strong for him to engage in direct challenge. The Battle of Cannae had shown that (218 B.C.). He therefore proposed to use the command of the sea, which had forced Hannibal to embark upon his long and circuitous march through Spain, to land in North Africa and threaten Carthage. He thus threatened Hannibal's base, caused panic at Carthage and could, by his show of strength in North Africa, count upon the support of allies who were ready to rise against the power of Carthage. This stage of his strategy was in the nature of a war policy, but he followed it up by establishing his camp near Carthage and awaiting the return of Hannibal. When he arrived, Fabius withdrew to an advantageous battlefield and lured Hannibal after him. The result of the Battle of Zama (212 B.C.) was a victory which extinguished the fighting power of Carthage, and Fabius was free to take possession of the capital.

The Indirect Approach. A Fabian strategy is also a strategy of indirect approach, combining both the sea and the land. As an example of the indirect approach overland, the expedition of Brasidas, the Spartan general, is worthy of note. Instead of aiming straight for Athens, he marched past her and attacked what he termed the "Achilles heel of the Athenian Empire" in Chalcidice, the granary of Athens. It was an indirect move which so weakened Athens that she was soon defeated at Amphipolis. The attack of the Spanish American colonies was equally a strategy of indirect approach. The Napoleonic strategy of attacking the sources of England's power by establishing himself across her communications in Egypt was no less an indirect approach. More recently, it may be said that the Gallipoli campaign constituted a strategy of indirect approach, also also did our defensive in Egypt in the early days of the late war.

The Direct Approach. Whatever the tactics employed which at that level may have been direct or indirect, as circumstances demanded, the German invasions of France in 1870 and 1914 were direct approaches at the highest strategic level. The attack against Russia in 1941 was also a direct approach. There was little room for any other course. On the whole it may be said that although there are many examples of the indirect approach in continental wars, the direct approach is a common feature in war between two land powers, and the indirect approach is no less a common feature in wars between two sea powers, or between a sea power and a land power.

A Continental Strategy. A grand strategy dominated by considerations of land power. The last point in the above paragraph is of significance in a conception of a continental strategy. Basically it reveals the manner of using the means of war on land and especially between two continental powers. The major strategic influences force a country with land frontiers adjacent to another to confine its security to armies, and the emphasis in all their strategies will, therefore, be upon the handling of armies. One of the features of continental strategy is that it invariably involves wars of unlimited liability, where the total warlike potential of one nation inevitably clashes with another because the prize is not only victory, but also the security of a nation's whole existence. Thus, the loss of a battle in such circumstances may mean the virtual annihilation of a nation or the total inability to continue the war, as at Austerlitz and Jena. In contrast, the loss of the Battle of Trafalgar by England would have been serious, but not a decisive defeat in the same sense.

Maritime Strategy. A grand strategy dominated by considerations of sea power. Maritime strategy is in essence the strategy of nations which depend for their livelihood and security upon the sea. Such nations, which may depend upon colonies for food and materials, have been able to fight desultory wars between each other without necessarily risking the security of their homeland. The term has come to possess a wider meaning than simply the strategy employed by naval commanders to out-manœuvre and fight the enemy's sea forces. Moreover, in recent times there has been a further extension of the term to identify maritime strategy with an indirect approach, because this is commonly the method of warfare used by predominantly sea powers against land powers. This is a confusing use of the term and should be avoided in modern times. These problems will be further discussed under the heading of "Traditional British Strategy."

Thus it will be seen how vague are the notions which have contributed to some of the broader conceptions of strategy. It is to no purpose to attempt to unravel further the thoughts contained in these conceptions, because it is of the very nature of strategy, in which many considerations of varying values are combined together, that the resultant should defy too precise analysis.

Traditional British Strategy

The two main influences upon our traditional grand strategy have been geography and the character of our people. Britain is an island. She, therefore, has no land frontiers contiguous to her neighbours. Her people were thus removed from the constant anxieties of a lightning invasion by the armies of the Continent. They were free to live in peace, and pursue their search for wealth in commerce. Had they not been enterprising and adventurous they might have lived quietly at a rural standard of life. However, they ventured overseas to open up trade. Had they been other than fair-minded, they might have plundered the weaker peoples of the world as the Spanish did in South America. This would have developed antagonism against them which would have broken out as soon as their strength was diverted in wars in Europe. And so England built up a rich commerce, becoming more and more dependent upon overseas sources for the commodities required to support her increasing population, and her very existence.

As an island, England learnt that as long as she could command the sea, her security was assured. Being dependent upon trade her shipping increased, and the need for protecting it increased. She developed a large ship-building industry and her people soon became masters of the sea-going arts. Any power which wished to overwhelm her must defeat her on the seas, but since all European nations were forced by geography to devote a large portion of their war potential to armies to ensure their own security, they were rarely able to maintain a fleet equal in strength to that of England. Thus England grew in strength even though her man-power and total war potential was by no means as great as the war potential of her continental adversaries. As an illustration, France might have had, say, a total war potential of ten units, of which only three could be afforded in sea power, while England, with a total of six units, could afford to concentrate five in her sea power. Thus England was able to rule the seas, and by a judicious foreign policy she sought to prevent the formation of naval alliances against her amongst the continental nations.

This handling of her affairs at the level of government war policy has long been referred to as a maritime strategy. Indeed, the history of England is founded upon it. Let us analyse it as far as it is reasonably possible to do so. We have seen that a maritime strategy at service level is concerned with war and naval operations in defence and offence. We have seen that the definition of grand strategy or government war policy is, "the direction and management of war . . . and broadly falls into three categories: political; moral and material; naval, military and aerial." The elements are, in fact, political, economic and fighting forces. At this level the influences underlying the policies behind all three have hitherto been maritime. Our foreign politics were governed by considerations of sea power, and preventing the formation of superior coalitions of sea power against us. Our economy depended upon seaborne lines of communications and the integrity of territories overseas. Between our military and naval strategies, there could be no question as to which we depended upon fundamentally for our security in the last analysis. From this naval fighting power there flowed naturally the offensive use of our sea resources, such as blockade and peripheral operations of limited liability, in order to impose our will upon the enemy. Thus, it may be truly said that our grand strategy was a maritime strategy.

The offensive strategy which followed naturally from our fundamental dependence upon sea power constitutes an excellent example of the strategy of the indirect approach. As a result some have used the term "maritime" strategy as synonymous with a strategy of the indirect approach. This usage, however, is only applicable to a particular set of circumstances in the case of England, and is misleading if it is imported into the realm of strategic thought as a term of general application. For instance, we have seen that Brasidas used a strategy of indirect approach against Athens, but no one would think of calling such a purely overland campaign a maritime strategy.

To investigate another confusion of thought; some have referred to the maritime strategy of England as being the only strategy which England can adopt, whoever her enemy may be, on the grounds that whatever warlike operations she undertakes, she will always be dependent upon her sea communications. She will certainly be almost exclusively dependent upon her seaborne lines of communications for very many years to come, but we must not confuse a maritime economy with the grand strategic notion of a maritime strategy, which embraced also the political and fighting aspects of the nation's policies. If fighting techniques change, then the political influences underlying our foreign policy will change, though we can hardly change our supply system. At a lower level, for instance, we have never heard of the strategy in our Burma campaign referred to as an air strategy simply because it was entirely dependent upon air communications. It is accordingly erroneous to refer to our strategy at any level as maritime, solely on the grounds that we are dependent on sea communications, however vital these may be.

Aviation History, 1903-1960

(A lecture by John K. Northrop in the Coolidge Auditorium of the Library of Congress, Washington, 3rd November, 1948)*

*** John K. Northrop is an internationally known aircraft manufacturer, engineer and scholar. Last year he delivered the Wilbur Wright Memorial Lecture in London before the Royal Aeronautical Society.**

As long ago as the early 16th century the great Italian artist and scientist, Leonardo da Vinci, made a workable sketch of a machine that might have been capable of carrying a man in sustained flight. In 1883 the American John J. Montgomery, and in 1891 the German Lilienthal both completed gliders or non-powered aircraft and made a number of controlled and successful flights therein. However, it remained for the Wright brothers in 1903 to complete the first controlled and sustained powered flights with man-carrying aircraft, and the history of modern aviation, at least insofar as heavier-than-air machines are concerned, can be considered to begin with the Wright brothers' development.

The coming-of-age of aviation has been dependent on two basic concepts. The first of these is the understanding and improvement of the aerodynamic and structural characteristics of the airplane itself; the second, the development of an engine having sufficient power for a tolerable weight to propel the airplane.

Since the first flight of the Wright brothers the essence of aeronautical history has consisted solely in improvement in these two basic elements which were first successfully combined in the Wright brothers' experiments. Modern aeronautics as well as the developments which may reasonably be forecast for the future consist, and will consist, of improvements in the structural and aerodynamic efficiency of the airframe plus the development of engines having greater power for a given weight and improved efficiency in transferring heat into mechanical energy.

It is interesting to note the part which the increase in airframe efficiency has played in aeronautical development since the time of the Wright brothers, and to estimate, based on present knowledge, what further expectations may be realized in the next ten to fifteen years. In order to visualize this improvement we may refer to Fig. 1. To the left of this figure are shown in front view three airplanes. At the top is the Wright brothers' airplane of 1903; next below is a modern, four-motored airliner, and at the bottom we have the cleanest type of flying wing which may be in military and commercial service before 1960.

The aerodynamic efficiency of these three types of airplane may be visualized by comparing the ratio of the maximum lift per square foot of supporting area with the minimum drag of the same surface. The maximum lift is a valuation of the load that may be raised from the ground and carried by the airplane, while the minimum drag is a measure of the resistance of the airplane to forward motion, and, therefore, the power necessary to overcome this resistance. The ratio of maximum lift to minimum drag gives us a rough comparative approximation of the overall efficiency of the airframe itself with regard to the type of power plant being used (except for its drag effect on the airplane).

The two middle columns of Fig. 1 show that the maximum lift per square foot has been approximately doubled since the time of the Wright brothers and that the minimum drag has been cut to one-fourth of its former value. The combination of these advances has resulted in a seven-fold improvement in efficiency in the past forty-five years and the figures indicate that it may be possible to realize a four-fold further increase in the next ten to fifteen years. In other words, we have increased the ratio of maximum lift to minimum drag from approximately 14 at the time of the Wright brothers to 100 in modern times and we may hope, based on present undeveloped basic research, for a further increase to 400 in the not-too-distant future.

The value of this improvement in airframe efficiency can perhaps be better visualized in the diagrams of Fig. 2. In this figure the same three airplanes are compared at a common size corresponding to a modern four-engined transport having a gross weight of about 100,000 pounds.

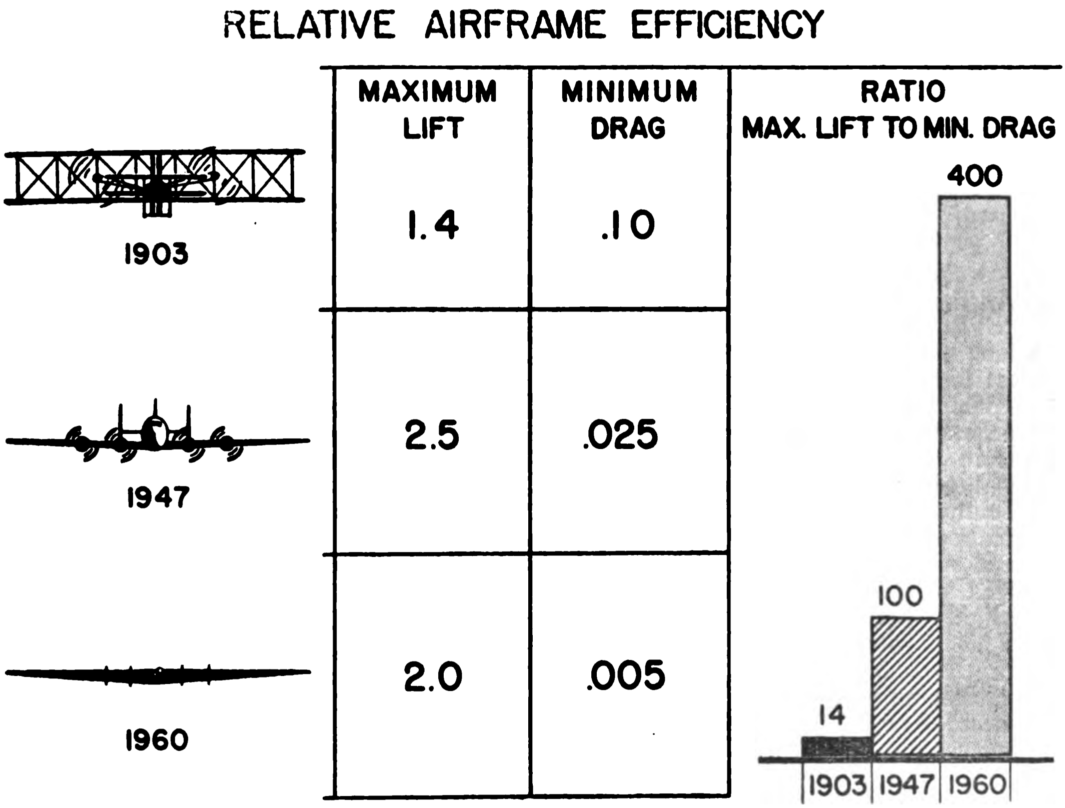


FIG. 1

The horsepower required to fly each of these airplanes at 300 and 600 m.p.h. is indicated by the length of the bars to the right of the chart. It may be seen that the improvement in airframe efficiency has been, and will continue to be, a most important factor in the increase of airplane performance. It is quite apparent that despite the tremendous development that has occurred and is occurring in the construction of lighter, more powerful and more efficient airplane engines, it would be impractical to drive the Wright brothers' airplane at modern cruising speeds without the use of huge power plants. It would be virtually impossible to force such a structure through the air at velocities of 600 m.p.h.

The modern four-engine transport or bomber suffers the same fate to a somewhat lesser degree when estimates are made of the power required to increase its operating speed from 300 to 600 m.p.h. The only type that seems capable of 600 m.p.h. operating speed with any reasonable size power plant is the cleanest type of airplane we can now conceive, incorporating all the known technical improvements for drag reduction.

The advance in overall aerodynamic efficiency achieved since the Wright brothers is fairly straightforward and easily understandable. The improvement in lift has been accomplished largely by the addition of auxiliary slots or flaps at the leading and trailing edges of the wing, which in effect cause the air deflected downward by the wing to move at a greater relative velocity than would be possible with a plain airfoil designed for high speed. However, highly cambered and slotted airfoils are not suitable for very low drag, high speed operation. Therefore in modern airplanes the flaps are retracted and the slots, if any, closed for high-speed operation in order that the maximum efficiency and minimum drag under high-speed conditions may be obtained.

The achievements in drag reduction are easily visualized from the diagrams of Figs. 1 and 2. The Wright brothers' airplanes consisted of box-like frames externally braced with a multitude of struts and wires. The engine and radiator were completely exposed to the air, as were the pilot and passenger. The fabric which formed the basic supporting surface was stretched over one surface only of the framework which constituted the wing structure. Therefore, a very large proportion of the airframe structure was unsuitable for easy or smooth passage through the air.

Both the degree and exposure and the shape of airframe parts have been greatly refined over the past forty-five years. This refinement consisted first in covering the wing surfaces on both sides with fabric so that both upper and lower surfaces were smooth. Brace wires were reduced in number and improved in shape, external brace members likewise were streamlined for easier passage through the air, and pilot, passenger and engine were enclosed, or at least partially enclosed, in a covered central body which reduced their overall drag considerably.

Such airplanes were used in limited numbers in World War I, and the refining process was given great impetus by the needs of that conflict. Later, biplanes with external bracing were simplified into internally braced monoplanes. Body shapes were improved and the pilot, passengers and payload were enclosed therein. Engines were designed in a more compact manner with less frontal area, and enclosed in carefully designed cowlings and fairings to reduce their drag as much as possible. Thus were evolved the comparatively clean and efficient monoplanes of World War II and the present era. These airplanes, equipped with very high powered engines, have made possible the 500 to 600 m.p.h. top speeds realized in to-day's combat aircraft.

The further improvement visualized in our prediction for the next fifteen years of development consists in eliminating the fuselage or body, all external power plants, the tail surfaces, and every element of the modern airplane except the wing itself. For further drag reduction we must apply the finest type of manufacturing technique to secure the smoothest possible surface contours. Finally, it may be necessary to incorporate

COMPARATIVE POWER REQUIRED

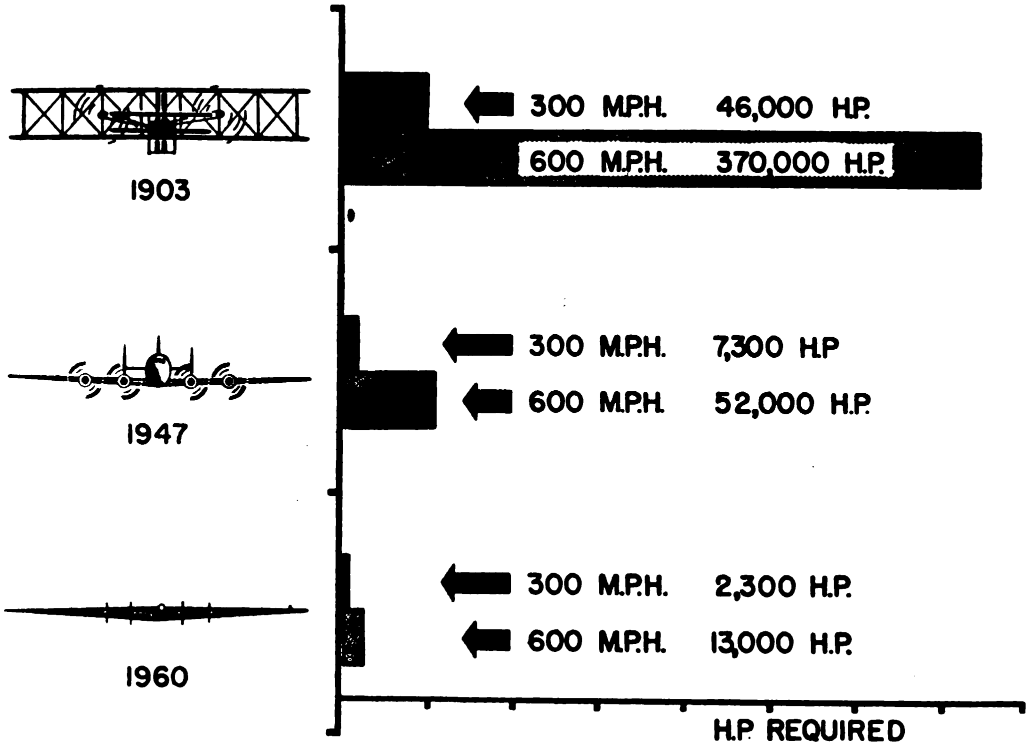


FIG. 2

POWER PLANT IMPROVEMENTS

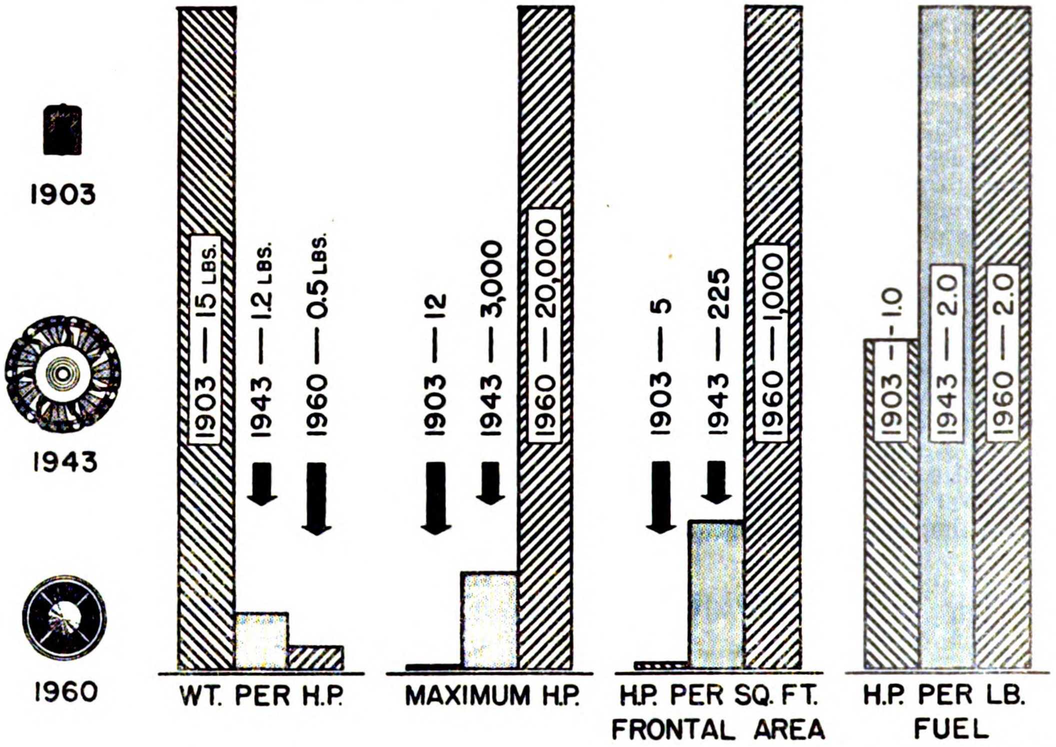


FIG. 3

a series of slots or orifices over the surface of the wing through which the turbulent boundary layer (responsible for a substantial portion of the drag) may be removed.

As a corollary to the preceding discussion it may be seen that the shape and size of the power plant have important effects on drag, and therefore affect the efficiency of the airframe. For this reason it has been necessary, in conjunction with the aerodynamic and structural improvement of the airframe, to develop engines of smaller frontal area, improved shape and higher power.

Our ancestors got along as well as they could with their own power or that supplied by domesticated animals until 1775, when James Watt perfected the first engine which utilized the chemical energy locked up in fuel to do mechanical work. In its time Watt's invention was as revolutionary as the modern idea of using atomic power to perform mechanical work. It opened a new and tremendous source of power for accomplishments far beyond the scope of man's puny strength and incorporated the principles of all heat-operated engines known today.

At the time the Wright brothers built their power plant the steam engine as envisioned by Watt had been fully developed and the steam turbine invented by Sir Charles Parsons in 1884 was well and favourably known. But the Wright brothers' choice was the internal combustion engine invented in 1885 and already proved to be the lightest available power plant for a given weight. It was the happy marriage of a reasonably efficient airframe and a comparatively light and powerful internal combustion engine that made the first Wright brothers' flights possible, and up until eight or ten years ago aircraft engines in general use were all advanced developments of the engine employed by them.

Over a period of years these engines have become much more powerful, considerably lighter per horsepower, and more efficient in their conversion of fuel to mechanical energy. The improvements achieved from the time of the Wright brothers to the early days of World War II are graphically illustrated in Fig. 3. Here the reciprocating internal combustion engines of 1903 and 1943 are compared as to weight in pounds per horsepower, maximum horsepower, horsepower produced per pound of fuel burned, and horsepower per square foot of frontal area. The accomplishments of forty years are most impressive, particularly in the growth of maximum power available from a single unit.

In the early days of World War II a virtual revolution occurred in the design of engines for aeronautical use. It was then that the concept of the internal combustion gas turbine became more fully understood and engines of this type came into preliminary use. The basic principles of the heat engine as understood by Watt in 1775 were still unchanged in the operation of the gas turbine. The normal heat cycle of compression, ignition, expansion and exhaust found in any automobile motor were still essential to the gas turbine, but the comparative simplicity of this type of power plant, its relatively enormous power for a given weight and frontal area, and its suitability to very high speed aircraft immediately caused a furore in the aeronautical field.

The gas turbine used either as a turbo-jet or to drive a propeller consists essentially of a rotary compressor, a combustion chamber, and a turbine capable of absorbing a portion of the energy contained in the hot combustion gases. The most spectacular use of the gas turbine is as a turbo-jet in which all of the energy not required to drive the compressor is released as a high velocity blast of heated gas, the reaction from which drives the airplane forward.

A more economical use of the gas turbine, at least for speeds up to 500 m.p.h., consists in extracting most of the energy by means of the turbine wheel and driving a propeller of conventional type from the turbine shaft. While the efficiency of the prime mover itself is about the same in either case, the overall propulsive efficiency of a propeller system is very much greater up to speeds of about 550 m.p.h., with the result that at speeds between 400 and 500 m.p.h. the range of a turbo-prop driven airplane may be nearly double that of one driven at the same speed by turbo-jets. The turbo-jet, however, is the most compact and most powerful type of air-

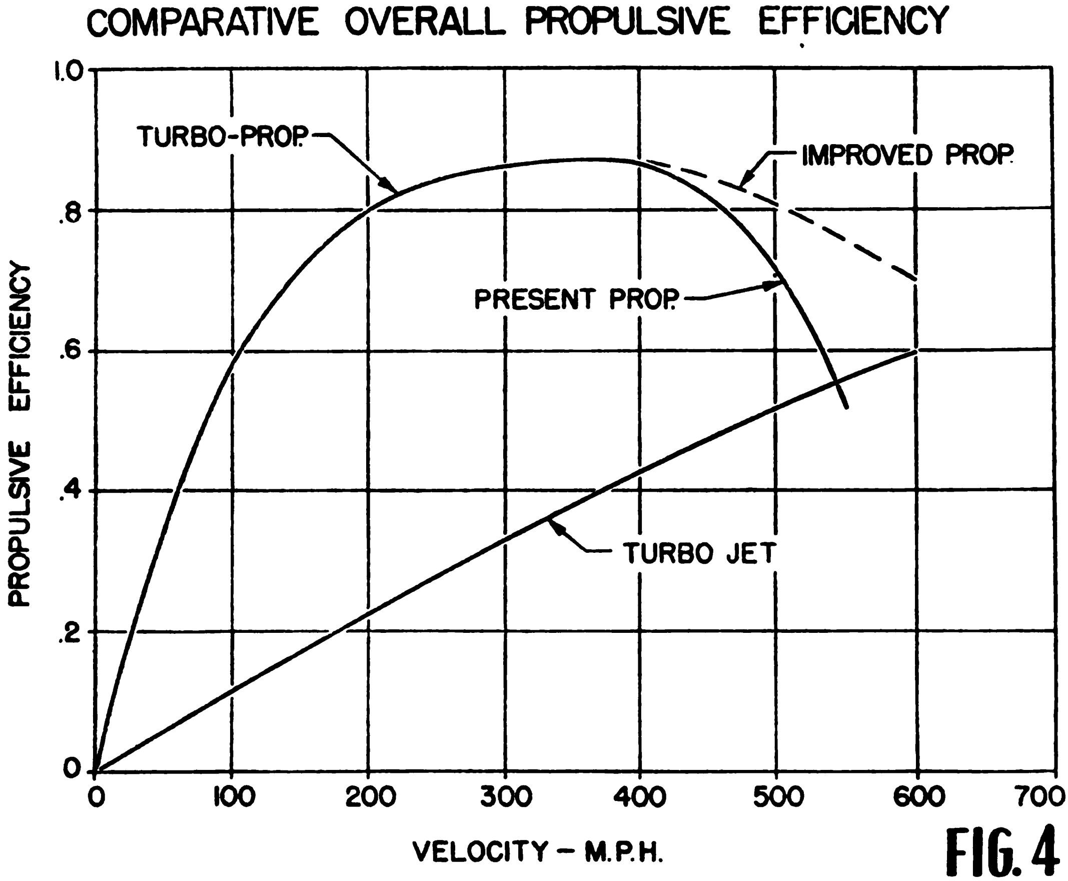

COMPARATIVE OVERALL PROPULSIVE EFFICIENCY

FIG. 4

craft power plant in present use, except for the rocket which will be discussed later. In Fig. 3 is included a comparison of a turbo-jet which may be expected to be developed by 1960. The great reduction in weight and frontal area per horse-power and the remarkable increase in total available power are obvious.

The reasons why the turbo-prop shows such advantages in range over the turbo-jet at operating speeds up to 500 m.p.h. are not generally understood. As stated above, the efficiency of the engine itself is about the same in either case. However, there is a well recognized mechanical law which dictates that for a given expenditure of energy a greater propulsive thrust can be obtained through moving a large mass of air at comparatively low velocity than a small mass of air at high velocity. A common experience demonstrating this law is that a small calibre, high velocity rifle will evidence less recoil than a low velocity, large bore rifle utilizing the same amount of powder. Or, putting it still more simply, a man on roller skates would roll backwards if he heaved a 16-lb. shot away from him, whereas he probably wouldn't move in throwing a tennis ball with equal energy.

Fig. 4 shows a comparison of the overall propulsive efficiency of a turbo-jet and a turbo-prop at various speeds. The difference in the height of these curves is the measure of the range of a given airplane if flown at the same speed and with the same amount of fuel in both cases. The lower curve of the turbo-jet improves with speed. The upper curve of the turbo-prop first increases much more sharply but drops at higher speeds due to the reduction in propeller efficiency which occurs as the blade velocity approaches and exceeds the speed of sound.

At the time the turbo-jet was introduced as a practical airplane power plant some designers did not fully realize the comparative limitations to which it was subject, and for several years the development of propellers for very high velocity operation was virtually abandoned.

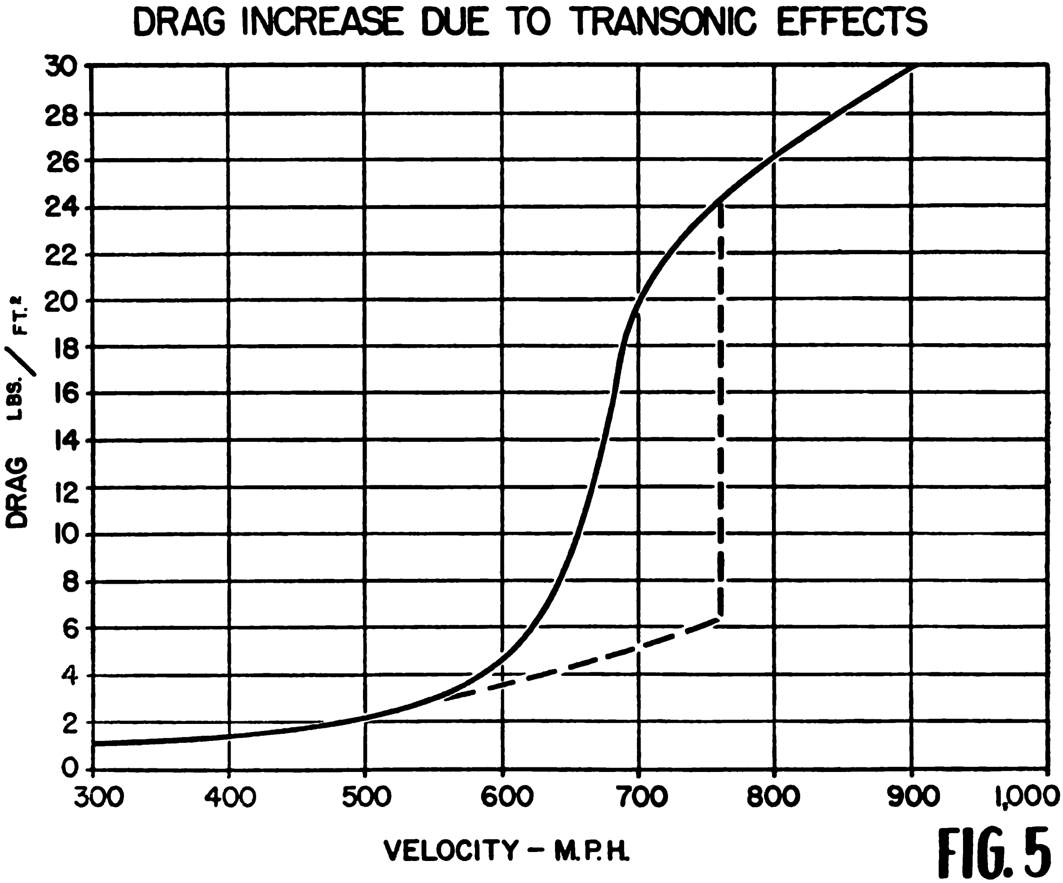

DRAG INCREASE DUE TO TRANSONIC EFFECTS

FIG. 5

Within the past two or three years, however, it has become apparent that very appreciable improvement in propeller efficiency at speeds up to 600 or 650 m.p.h. can be obtained. When this is done the relative improvement in the performance of the turbo-prop power plant over the turbo-jet may be extended to higher speeds than at present, as shown by the dotted line on the right-hand side of Fig. 4. It is your speaker's opinion that the turbo-prop will become the most important type of power plant for long-range bombers and transports for the next decade, with the turbo-jet showing its most suitable use in very high-speed fighters, medium range bombers and guided missiles.

The rocket has been neglected so far in this discussion of engines for aircraft propulsion. The engines previously described all utilize atmospheric oxygen as one of the elements required for the production of heat. The rocket likewise requires oxygen in its combustive process, but the oxygen is always carried along as part of the fuel in the vehicle and is therefore available for reactive propulsion regardless of whether the vehicle is operating in the earth's atmosphere or outside it. Based on our present knowledge of power plants requiring atmospheric oxygen we believe an altitude of ten to fifteen miles is the maximum practical height at which such engines can operate efficiently, whereas there is no such limitation in the flight of rockets which have already ascended to an altitude of over 100 miles.

The *duration* of rocket powered flight will always be short if the vehicle is subject to return to the earth through its gravitational influence. The reason is simply this. The weight of oxygen for proper combustion with most fuels is three or four times the weight of the fuel necessary for complete chemical reaction. Therefore, even if pure liquid oxygen is burned and no weight is allowed for the heavy containers necessary to carry such material, the duration at comparable power will be only about 20 per cent. of that possible when atmospheric oxygen is used. The *range* of rocket powered flight, however, is theoretically very great in certain types. After leaving the earth's heavy atmospheric blanket the velocities of the rocket may be stepped up to over ten times the values practicable in the lower atmosphere, with the result that the range of vehicles powered by rockets and those powered by atmospheric engines may be in the same order. Studies of guided missiles show that ranges of several thousand miles are practicable with either type of vehicle and that the choice must be based on other considerations than the technical possibilities.

Early in World War II, along with the development and use of the gas turbine and rocket types of aircraft engine, came a need for higher speed flight and a better understanding of the forces encountered in transonic and supersonic operation of aircraft. Great changes in aerodynamic forces occur when the speed through the air is such that air molecules flow over a surface at speeds approaching or exceeding the speed of sound. The reason for these basic changes is simply that up to the speed of sound the air molecules are able to transmit from one to another a signal of the coming disturbance and so move or arrange themselves as to best permit the passage of the object. However, at sonic velocities and above, this telegraphic advance warning no longer occurs. There is no prearrangement of the air molecules and as a result the air is forced away from the object in violent and irregular patterns which induce pronounced and rapidly changing reactions.

One of the important effects is that the drag of the object or airplane, and therefore the power required to drive it through the air, increases very greatly in the transonic and supersonic ranges. The speed of sound has often been erroneously pictured to the layman as an impenetrable barrier or wall at which mysterious and terrible things happen. Likewise it has been a popular concept that if the sonic barrier were ever passed a calm region would be reached in which flight would be relatively easy. Neither of these ideas gives a true picture of what happens as the speed of the airplane is increased.

Fig. 5 indicates the drag of a conventional airplane plotted against its velocity. Starting at low levels in the lower left-hand corner of the chart the drag increases as the square of the speed up to approximately 500 m.p.h. At this speed there is a sharp increase corresponding to the added drag of the various elements of the airplane as the air flow over each element reaches sonic velocity. There is no instantaneous overall effect of this increased speed for the reason that certain portions of the airplane are affected prior to other portions, and the overall result is cumulative rather than sudden. If all portions of the airplane reached sonic velocities at the same instant the curve of drag increase and power requirement would jump suddenly, as shown in the dotted line.

The particular point of importance to be deduced from this figure is that there is never a decrease in drag beyond the speed of sound. Likewise, there is never an increase in lift beyond the speed of sound, so that the overall efficiency of any airplane is definitely lower in the supersonic range than in the subsonic range.

It will, therefore, always be more expensive in terms of power required to fly an airplane at supersonic speeds than at subsonic speeds, although other advantages, particularly of a military nature, may dictate the wisdom of expending energy for this purpose.

In addition to the marked increase in drag which occurs in the transonic region there are similar and equally adverse effects on the stability and controllability of the airplane. A movement of the control surfaces which would cause the nose of the airplane to point upward at subsonic speeds might have the reverse effect at transonic or supersonic velocities. It has been this uncertainty and the resultant inability to predict flight characteristics at high velocities that has made the exploration of transonic and supersonic speeds with man-carrying airplanes such a hazardous undertaking, requiring an extremely cautious approach. However, research during the past two or three years has greatly augmented our knowledge of these effects. Supersonic flight has been officially confirmed and several airplanes designed specifically for such operation are completed or nearing completion.

In spite of our increasing knowledge of the subject there is a serious question in your speaker's mind as to whether supersonic aircraft can be developed as economically sound passenger or freight carriers. While an increase in transport cruising speeds of from 300 to 500 m.p.h. may be accomplished within the next decade, a further increase from 500 to 700 m.p.h. may not be economically sound in the following thirty or forty years unless cheaper and more abundant sources of power come into general use.

One such possible source of energy that has occasioned much public speculation is atomic power. That tremendous stores of energy exist in all common matter is now a well authenticated scientific fact. The release of relatively minute quantities of such energy has given us an explosive 20,000 times more powerful than any heretofore known. It would seem a comparatively simple matter to utilize the heat obtained from the fission of atoms in the combustion chamber of a simple gas turbine and use such a device for the propulsion of aircraft. This is probably the form that the first atomic powered prime movers will take but the problems involved in the control and safe use of this power are of tremendous magnitude. Likewise, the poisonous by-products of atomic fission could easily become a menace to all life on the face of the earth. Therefore the development and operation of atomic power plants must be approached with extreme caution.

The availability in the earth's surface of elements presently known to be fissionable is still not fully determined, but there is no indication at present that their abundance is such as to justify commercial use for power development purposes, even after the technical problems are solved. The probability is that for some time to come the use of atomic energy will be strictly limited to explosives and the propulsion of very long range military vehicles of sea and air.

So far in our discussion we have covered only basic essentials of aviation development and have not touched upon the complex technical equipment that is required in the operation of both military and commercial aircraft. In the days of the Wright brothers the airframe itself was the most complicated and expensive element of the whole airplane, whereas in modern times the cost of engines, propellers, instruments, armament, radar, radio and similar equipment usually exceeds the cost of the airframe.

Radar came into general use in World War II and was perhaps the most valuable military tool brought into service during that period. Its use for both the detection and guidance of aircraft has been an essential element of all-weather bombers and night fighters during the past few years. Radio for communication and guidance is equally essential for modern military and commercial aircraft. Armament has been developed from single 30- and 50-calibre guns pointed and fired by hand to exceedingly complex automatic systems, wherein radar and computing equipment not only detect the target but make automatic calculations to determine in which direction the gun should point in order that the bullets may reach the target, whether stationary or moving.

Higher speed and higher altitude operation have been achieved with refined airframes and increased power, as pointed out previously. However, these higher speeds and higher altitudes involve a multitude of new technical problems which must be solved to permit the human machine and man-made mechanism to operate under the peculiar conditions involved. At higher speeds heat is generated, just as it is in a hand pump when air is compressed to put into a tyre, and above 500 m.p.h. it becomes necessary to refrigerate the air for human comfort and survival. At high altitudes the oxygen content of the air becomes so low that unless air is compressed in the cockpits to the equivalent of that at safe altitudes the pilot and crew may become unconscious and die within a few seconds of loss of pressure. Therefore it is necessary, at altitudes over 25,000 ft., to provide oxygen under pressure and auxiliary oxygen masks, even in pressurized cabins.

At high altitudes the rarified atmosphere permits electrons to skip freely from terminal to terminal in a manner impossible at lower altitudes, thereby confusing electric and electronic circuits intolerably. Therefore many of the instruments and accessories carried in the airplane must be pressurized even when this is unneccessary for human needs.

All these complications mean that the airframe is no longer the major cost item. The contributions of engine and so-called accessory manufacturers are often of greater importance and dollar value than that of the airframe manufacturer.

The cost of a given type of airplane has increased tremendously in the six-year period from the beginning of World War II to the present. This increase in cost is of serious concern to the Military Services and the airframe manufacturer as well as to the taxpayer. Problems concerning the wisest expenditure of the taxpayer's dollar for national defence have become extremely difficult of solution. Due to the manifold complications and variations possible, not only in the airframe itself but in its equipment, there can be very honest and sincerely held differences of opinion. Such questions as whether a long-range strategic bomber should carry only its bombs, a crew of two or three and a minimum of short-range communicating equipment, or whether it should be heavily armoured, carry a large protective crew and be able to communicate on many frequencies throughout its flight confuse the best informed minds. The latter airplane will be much heavier and more expensive than the former, and probably will have less range. Therefore fewer of them can be built for a given expenditure. The balancing of the advantages of the two concepts is a highly technical process which cannot be undertaken by any except those with extensive technical training and years of experience.

In the near future we can expect similar arguments between the proponents of guided missiles and manned aircraft. Certain members of the Air Force and Naval Air Arm, trained from cadethood as pilots, naturally will be reluctant to admit the feasibility of unmanned guided missiles, yet the latter have great strategic advantages and, in some instances at least, approach readiness for production.

Because of the extreme seriousness of the problems involved in increasing costs it is of interest to compare cost elements of a 1942 experimental night fighter with those of a similar airplane at the present time. Fig. 6 shows a direct comparison of the cost of two experimental night fighters completed and tested in 1942, with that of two airplanes designed and built by the same company and for the same purpose, and test flown in 1948. It may be seen that the modern machines cost three times as much as those completed only six years ago. Of this increased cost approximately one-third is accounted for by the fact that the modern machine is heavier than its predecessor. This increase in weight is due to the fact that it has been designed for very much higher velocities and the severe aerodynamic conditions associated with operations in the transonic range. It likewise must carry heavier armament and aiming mechanism plus more complicated radio and radar equipment.

If we eliminate the increased size and compare the two airplanes on a pound for pound basis we find that the 1948 airplane costs about twice as much as its 1942 counterpart. This increase is due partially to inflation or increased hourly rates in engineering, tooling and factory labour, and partially to the increase in the cost of both raw materials and finished products such as engines, radar and radio components used in the airplane. The actual number of engineering hours per pound has only increased slightly because the increased complication of most accessory installations has been, in part, offset by the comparative simplicity of gas turbine engine installation. Tooling labour has increased markedly due to the more accurate tolerances to which the new airframes must be built for the higher speeds now developed, while factory labour per pound remains virtually unchanged. The large relative increase in the cost of raw materials and finished accessory items ordinarily furnished by the government is a reflection of the well-known inflation in wage rates as well as the increased complications of the accessories themselves. It is difficult to determine at this time whether costs will continue to increase in similar measure in the future. It is hoped by some that a plateau of wage and material costs has been reached and that the trend in these items may soon start downward.

Recent cost increases are more easily understood when it is realized that in the five years since 1943 the maximum engine powers achieved have reached 10,000 h.p., whereas it took forty years to progress from the 12-h.p. engine of the Wright brothers to the 3,000-h.p. engines of 1943. Such tremendous modern powers permit airplane speeds and altitudes never before considered possible. The complications of radar guidance and detecting apparatus, the advance in

COMPARATIVE COST
EXPERIMENTAL NIGHT FIGHTERS IN 1942 AND IN 1948

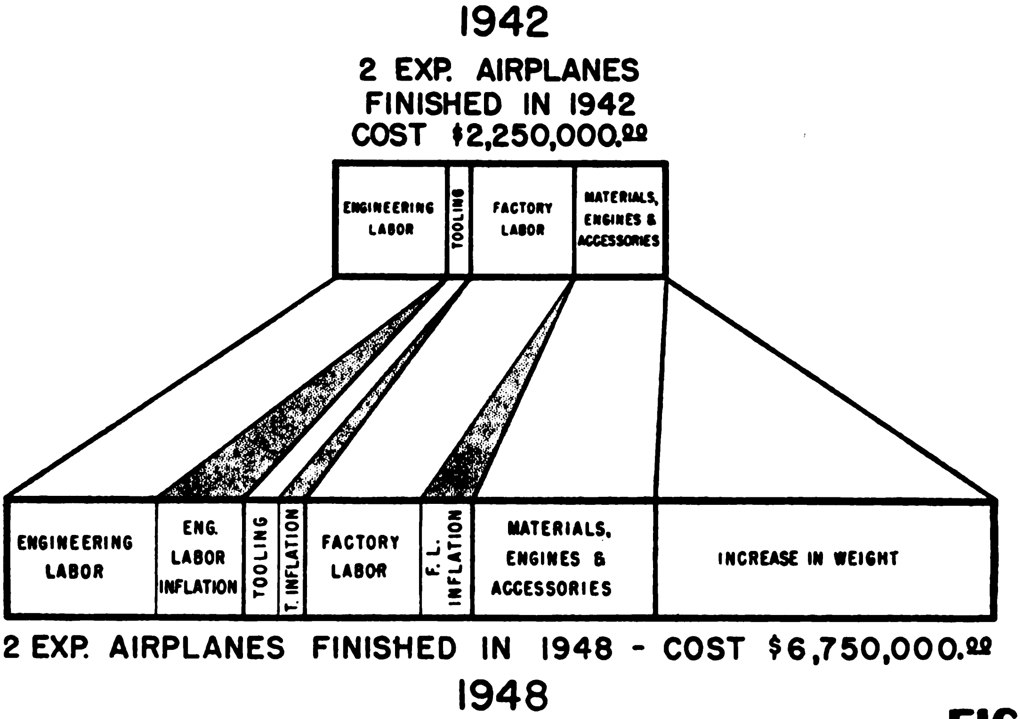


FIG. 6

radio communication systems, including the use of television for the guidance of missiles, and automatic gun-laying and firing all seem to have combined in the past five years to present a peak of complexity and costly development.

There is a faint hope that simplification rather than added complication of aircraft and accessories may attend the next swing of the pendulum, but at least for the next few years adequate technological improvements in our apparatus of defence will be far more costly than we have ever before considered possible.

The guided missile is just emerging as a possibly cheaper defence weapon than the more complicated man-carrying machines in use at present. Such missiles must of necessity be designed for utmost simplicity in view of the fact that they are expendable. Elimination of the pilot and all the equipment he requires for comfort and a degree of safety permits great simplification in the airframe itself. Likewise, means for guidance will be less complicated than the full gamut of radio and radar now deemed necessary for manned aircraft. A power plant good for a few hours' flight is bound to be less costly than one designed for hundreds of hours' use.

In this connection it is most important that we recognize the necessity of a well-considered and not too hasty transition from one type of equipment to another. It is necessary that we maintain and encourage the continuation of our reciprocating engines until such time as the turbo-jet and turbo-prop have been developed to an equal degree of economy and reliability. It would be suicide to stop the manufacture of our manned bombers until such time as the efficiency of the substitute guided missile has been proved beyond question of a doubt. These transitions must come gradually, with the unavoidable result that at this time the American taxpayer is paying for two parallel systems of protection. The first of these may be the end of an old era of warfare; the second is certainly the vanguard of a new era which must not be ignored. It is obvious that any such shortsighted policy would permit a potential enemy to solve the attendant problems of operation before we do, with catastrophic results.

In the days before the advent of World War II the science of aviation was a comparatively simple study. Today, however, the complexity of characteristics, equipment and tactical requirements have rendered the selection of military aircraft a highly intricate problem which can only be resolved by men having the maximum possible background of experience in aircraft design, maintenance and use. The trend toward increased technical schooling of Air Force and Naval Air Arm officers is highly desirable. The men assigned to material procurement must be trained specialists of the highest ability if they are to expend the taxpayer's dollar in the wisest possible way. There are so many considerations affecting aircraft and accessory selection and procurement that a modern Solomon could hardly be expected to show perfect judgment. The best men available in this country will make mistakes in terms of hindsight, but these mistakes will be far less in number than those to be expected of personnel without adequate training and experience. When a procurement decision involves hundreds of millions of dollars instead of hundreds of thousands, it is vitally important that such decision be based on the judgment of the best-trained minds, unaffected by considerations other than the technical aspects of the problems involved.

Predictions concerning the future of aviation are a dime a dozen. They blossom forth in the daily paper, in the blurbs of news commentators and in the columns of magazines of all types and prices. They vary widely and are worth little unless substantiated by a broad cross-section of informed opinion. Even then they may be wide of the mark. In 1938 a British aviation magazine invited a number of the foremost English engineers to write aeronautical forecasts. A review of the printed record furnishes an interesting comparison with the facts. It was then almost unanimously believed that large flying-boats would be the universal long-range air transport vehicle, yet today at least 95% of long-range transport is by landplane, to which the ocean holds no terror.

Almost all of the experts thought that military plane speeds could never exceed 600 m.p.h. and that 200 to 250 was the all-time economic limit for passenger transports. Both categories have already exceeded these estimates by a wide margin. The individual who seemed to have the best insight into the future on most matters thought it would be at least ten years before pressurized cabin transports would be practical, yet such airplanes were in regular airline service in the United States within two years. Wood was recommended by one designer as the most suitable material for military airplanes; another thought 3,000 h.p. to be the all-time maximum power that could be expected from aeronautical engines. A third bold soul stuck his neck way out and predicted that wing loadings might reach an all-time maximum of 45 lb. per square foot.

The above forecasts, wide of the mark as they are, are not quoted to discredit their authors. These gentlemen were perhaps as well qualified a group of aeronautical engineers as existed anywhere on earth. But the comparisons certainly teach caution in taking any such predictions too seriously, and prove, if anything, that the best consensus of opinion will be ultra-conservative, even in the high velocity business of aviation.

Tonight we are committed to an extension of aviation history to 1960, which we will undertake, keeping the above qualifications in mind. Our opinions are based on over thirty years' active participation in the history of aviation, but certainly do not represent any broad consensus of the ideas of aviation authorities.

First, and most important, it is believed that pilotless guided missiles will come into military use within two years and will form the main backbone of the Air Force's offence and defence by 1960. Although several intermediate steps will be involved, two predominant types will hold the stage at that time.

The first of these will be a long-range winged missile propelled by suitable power plants now in existence and capable of carrying large loads of T.N.T. or any other destructive war-head. The know-how for this missile operating at speeds of approximately 600 m.p.h. is presently available and is capable of extension to over 1,000 m.p.h. before 1960. It will have sufficient range for launching from Continental United States against any desired target in the Northern Hemisphere, and will be navigated by entirely automatic means.

Such missiles will largely, if not completely, supplant the long-range bomber of the strategic air forces and, all things considered, will deliver a pound of war-head at a lower cost to the country's economy than has ever been possible with manned aircraft. They will have many advantages over present piloted planes, some of the principal ones being, instantaneous mobility, high accuracy, and negligible maintenance costs. Their use will move the focus of military hazard from the cockpit of a bomber to the industrial areas in the heart of combatant nations.

Variations of this long-range missile may cover most of the reconnaissance and photo missions now undertaken by reconnaissance aircraft.

The second type of missile predicted for general use will be a ground-to-air interceptor which will almost completely replace manned fighter aircraft. This missile will be much smaller than present fighters, it will be rocket-powered, equipped with automatic devices for guidance to its objective, and will constitute the sole effective defence against a mass attack from enemy long-range missiles. The balance of power in the offensive-defensive conflict will depend on the efficiency of detecting apparatus and the organization and co-ordination of defence forces operating the ground-to-air defensive missiles.

The offensive missile definitely will have the advantage. Some will be intercepted but not a large percentage in a co-ordinated mass attack. Tremendous value to the aggressor will lie in the unexpected or unannounced blow. It will require the development of fully automatic detection and defensive missile launching equipment to give a reasonable degree of security against enemy attack. The offensive missile will be available years before a defensive system capable of stopping a high percentage of such missiles can possibly be developed and installed.

Manned military aircraft will probably be limited to transports of various sizes and categories. The transport will remain an essential factor in the efficient conduct of any military operation, and it is believed the military transport will in general be quite similar to its civilian counterpart in 1960, as it is today.

The long-range transport for both civilian and military use is envisioned as the cleanest possible design described earlier in this discussion. It will be a flying wing having a gross weight between 100,000 and 200,000 lb. and will have a direct operating cost of less than 5 cents per ton mile of payload. Because of the continuing need of fuel economy in its operation it will probably cruise at about 500 m.p.h. and be driven by gas turbine propeller power plants rather than turbo-jets. If there are any manned bombers in 1960 they will be quite similar in external appearance to the transports but will carry, in addition to their turbo-props, turbo-jets and possibly rockets for flash performance under emergency conditions.

If our development of atomic power plants for aircraft is vigorously pursued, we can probably have large airplanes driven by nuclear energy in service well before 1960. They will have unlimited range and very high speeds. Such ships will be enormously expensive and therefore comparatively few in number. Except for specialized service they will be inferior to the guided missile in their ability to deliver a war-head to enemy territory at the lowest cost to our country's economy.

In your speaker's opinion the rocket as a prime mover for long-range guided missiles will not be in general use by 1960 for the following reasons: First, the problems attendant to accurate guidance of such a vehicle to its objective are more difficult of solution than for a winged missile; second, the development of such a vehicle will require much more time and money; third, fuels of a different type than are now generally available in quantity are essential to the rocket. The provision of facilities for the manufacture of such fuels in large quantity will take several years even if pursued on a high-priority war-time basis. The rocket is no doubt technically qualified for the role of long-range war-head delivery in the future. Its detection and interception are much more difficult than is the case with any other known vehicle, but for the reasons outlined above it is believed its development will require at least ten years longer than that of the winged missile powered by a turbo-jet.

In the field of power plants large vistas of improvement lie open before 1960. If the turbo-jet is to be used effectively in long-range supersonic missiles, a large increase in thrust per square foot of frontal area must be achieved. Methods are known whereby this factor can be at least doubled over the best turbo-jet power plants now in use in this country. Such improvemen would approximately double the range of a long-range guided missile flying at speeds of from 1,200 to 1,500 m.p.h. Such a power plant is shown in Fig. 3 compared with the engines of 1903 and 1943.

Our summary must leave the very survival of American civilization pretty much in the hands of the diplomats. Science has far out-reached our ability to control its destructive potential. The sneak attack can be all-powerful and completely devastating in effect. Our great cities with their marvellous industrial powers for good or evil may become our first-line trenches long before 1960.

The Air Forces in Parliament

By Squadron Leader R. F. Pemberton, M.C., T.D.

[*The Editor hopes to make this a regular feature of the* R.A.F. QUARTERLY. *It will include brief notices of all important decisions and statements made in Parliament which affect the Royal Air Force, The Royal Air Force Volunteer Reserve, the Royal Auxiliary Air Force, the Women's Auxiliary Air Force, the Royal Observer Corps and the Dominion Air Forces. Dominion contributors are invited to call the Editor's attention to anything of interest to readers that is said or done in their own Parliaments.*]

OFFICERS' UNIFORMS ON COMMISSIONING

Cost and Purchase Tax

In reply to a question, the Minister of Defence said: "It has been agreed in principle that the State should in future meet the reasonable cost, including purchase tax, of officers' uniform on commissioning. The amount of the grant will be based on prescribed scales and standards. These and other details are now being worked out and will be announced as soon as possible."

(*Hansard*, 3//11/48)

DEFENCE RESEARCH AND DEVELOPMENT

Co-Ordination Within the Commonwealth

In a written answer to a question, the Minister of Defence said: "There is already a very considerable degree of co-ordination with other members of the Commonwealth on matters relating to defence research and development and arrangements exist for discussion and consultation at regular intervals. Discussions on production are also carried on, as necessary.

(*Hansard*, 8/11/48)

PRIZE MONEY

The Prize Bill was read a third time in the House of Commons on 22nd November, 1948. Under this Bill, if and when it becomes law, a sum of £1¼ million is allotted to the Air Force. "It is not intended that the money should be distributed to individual members of the Air Force," but it "will be made available to charitable and welfare organizations serving past or present members of the Air Force. . . . Half the fund is to be used for the welfare of those now serving and the other half to be distributed to organizations such as the Royal Air Force Benevolent Fund and the Royal Air Force Association and other bodies and institutions which have among their aims the welfare of past members of the Service." (*Hansard*, 22/11/48)

RECALL OF ARMY AND AIR FORCE PENSIONERS

The Bill with the above title was read a third time in the House of Commons on 22nd November, 1948. It provides that certain pensioners of the Army and Air Force shall be liable to recall to their Service if they are within certain age limits and if they are not in reserved occupations.

(*Hansard*, 22/11/48)

DEFENCE POLICY

At 3.44 p.m. on 23rd September, 1948, in the House of Commons, the Minister of Defence (Mr. A. V. Alexander) moved: "That this House takes note of the statement made by the Lord President of the Council on 14th September relating to Defence."

Collective Security

In the course of his speech, Mr. Alexander gave the following details, among others:

Our defence policy was based on the principle of collective security and we had hoped that we might be able to build that security through the United Nations Organization. But unhappily collective security had not been achieved. There was unrest in many quarters of the globe; and in many of these, vital interests of this country were concerned.

In these circumstances we might have to build collective security through regional security, as was contemplated in the Charter of the United Nations. We should at all times make the greatest contribution to collective security that we could possibly afford.

The Minister of Defence referred to the Western Union Five-Power Military Committee and to the meeting of the Chiefs of Staff of the Five Powers in London on 25th August, 1948. While putting our whole strength behind Western Union, he said, we would not overlook our part as a member of the Commonwealth. The foregoing was the background against which His Majesty's Government had to decide our defence policy.

Deferment of Release

The general deferment of release from the Armed Forces announced on 14th September, 1948, was decided upon in order to preserve the balance of trained and untrained men in the Forces, which balance was threatened by normal releases at a time of international danger. As a result, the total strength of U.K. personnel in the Armed Forces on 1st January, 1949, would be about 825,000.

The National Service Act depended for its success on an adequate recruitment for the regular forces; as the regulars, in addition to their other duties, would be required to undertake the training of the N.S.A. men.

Decline in Recruitment

Regular recruiting had unfortunately not met our requirements, though it had been better than in the corresponding period after the First World War. About 29 per cent. of the recruitment since 1946 had been for short-term bounty engagements for three, four or five years' service; and unless a substantial number of these men re-engaged, we should face a new decline in regular strength in one or two years' time.

The position in the Royal Air Force might be particularly serious because already their rate of recruiting had recently declined much more sharply than had those of the Army and Navy. Recruits were specially required for the technical branches.

Pay and Resettlement

The Minister had previously promised to review the New Pay Code of 1945. (An announcement of new scales of pay was made in the House on 24th November, and is reported below.) A good deal of progress had already been made in the provision of married quarters this year.

Towards solving the problem of resettlement in civil life after discharge, certain arrangements had already been made:

(*a*) A scheme was being worked out for providing openings in Industry for ex-Regulars.

(*b*) In the Civil Service, a number of vacancies in the clerical and executive classes would be reserved for competition among ex-Regulars, and ex-Service men wishing to take the entrance examination for the administrative classes would be allowed to deduct from their actual age the period of service they had given to the Forces.

(*c*) Trade Unions had already agreed that men trained in a wide range of Service trades should be qualified for membership of their Union as skilled men.

(*d*) Special training for civil employment, both within industries and in Ministry of Labour establishments, would be available.

Reserve and Auxiliary Forces

The building up of the Reserve and Auxiliary Forces was one of the most necessary and urgent of the measures now being undertaken. The Royal Air Force Volunteer Reserve and the Royal Auxiliary Air Force between them wanted 60,000 additional volunteers. Recruits were also needed for the Royal Observer Corps, "a vital component of the air raid warning system."

Until the plans for building up our trained reserves were matured, we had at hand "the trained and battle-proved men and women who carried us to victory in 1945." This represented our present "real Reserve" as they were still liable to recall in an emergency. Schemes for the registration of ex-Service men and women who would be able and willing to rejoin their Services immediately on, or even before, the declaration of an emergency were being prepared.

Equipment

"We have not, so far, had to undertake large-scale production of existing types of equipment since the war because of the large stocks which were left over at the end of hostilities" and "we have been using these stocks to meet the current needs of the Forces, concentrating our resources on the development and small-scale production of new types of armaments intended for the gradual re-equipment of the post-war Air Forces. . . .

"We have given research and development a first priority and we shall continue to do so. We must look ahead, and we shall not allow our present problems to deflect us from the vital task of ensuring that, in the many new fields, we shall be abreast with, if not ahead of, development elsewhere. . . .

"In the case of aircraft, we are stepping up the production of the latest types of jet interceptor fighters to nearly double the former planned rate. At the same time we are accelerating the inspection and re-conditioning of war-time types of other aircraft at present in store."

(*Hansard*, 23/9/48)

NATIONAL SERVICE

EXTENSION OF PERIOD TO 18 MONTHS

The National Service (Amendment) Bill was read a first time in the House of Commons on 24th November, 1948. This amending bill proposes to substitute 18 months for 12 months as the term for whole-time service in the Forces under the National Service Act 1948, and to reduce the aggregate of whole-time and part-time service from 7 years to 5½ years.

(*Hansard*, 24/11/48)

INCREASES IN PAY AND ALLOWANCES

In reply to two questions in the House of Commons on 24th November, 1948, the Minister of Defence announced certain increases in the marriage allowances of officers and in the pay and allowances of other ranks of the R.A.F. in order once again "to secure broad equality between Service emoluments and rates of wages for comparable civilian employment." Among the Minister's announcements were the following:

Officers.—"As regards officers, the present rates of pay take account of the special expenses involved in Service life; we have, however, decided that in present circumstances some further assistance is necessary for married officers. . . . The rates of officers' marriage allowance will therefore be increased by 6s. a day if they are not accommodated in married quarters, and by 3s. a day if they are so accommodated, or receive special local overseas allowances designed to protect them against high rents. . . . After full consideration we do not feel that, in present circumstances, increases in the basic pay of officers are justified."

Airmen (*Regular*).—"The present rates (of marriage allowance) for other ranks range from 35s. to 45s. a week. In the case of men serving on voluntary regular engagements the revised range will be from 42s. to 56s. a week, an increase of from 7s. to 11s. As regards pay, there will be no increase for recruits during their first six months' service, nor for the private soldier or his equivalent without any special trade or other Service qualifications. For men with higher qualifications or higher rank, however, there will be increases in basic pay ranging from 3s. 6d. a week to as much as 10s. 6d. a week. . . . In all, therefore, the increases for married men will range from 1s. up to 21s. 6d. a week."

National Service Men.—"The new rates of marriage allowance will not apply to National Service men. They will, however, be eligible to have their Service emoluments supplemented by a system of National Service Grants, similar to the War Service Grants which were introduced, for the same purpose, during the war. . . . The increases in pay will apply to National Service men after their first year of service. Until they have completed this period of service no improvement in the existing rates of pay is, in our view, necessary."

(*Hansard*, 24/11/48)

STATE OF THE ROYAL AIR FORCE

HOUSE OF LORDS DEBATE ON 24TH NOVEMBER, 1948

An interesting debate on the state of the Royal Air Force took place in the House of Lords on Wednesday afternoon, 24th November, 1948. Among the distinguished and well-qualified speakers were Viscount Templewood, who had been Secretary of State for Air in three successive governments soon after the First World War; Viscount Trenchard, who is rightly called the Father of the Royal Air Force and was Chief of the Air Staff in the early days of peace between the wars; Viscount Portal, of Hungerford, who was Chief of the Air Staff during the latter part of the last war; and Lord Balfour of Inchrye. A selection of points from their speeches is appended for the interest and information of our readers.

Lord Templewood opened the debate by calling attention to the present state of the Royal Air Force and to the vital importance of British air power to the Commonwealth, to Western Union and to the United Nations. He based his argument on two propositions: (i) "that no major military operation can succeed under modern conditions without mastery of the air; and (ii) that, in the present condition of the world, Anglo-American air power can be the most formidable military deterrent against aggression and can be the most effective military means of ensuring European and world security."

In 1940, Lord Templewood had been again at the Air Ministry and had there and then realized that it was urgently necessary for the future to have (i) an Air Force strong enough to strike at once, and (ii) a strong force of bombers for air defence. He reminded the House of two short statements made by two German Field-Marshals. Field-Marshal von Rundstedt had said: "the collapse of Germany was due to the enemy's complete mastery of the air"; and Field-Marshal von Kesselring had said that the chief reason for the German defeat had been "allied strategic bombing behind the German lines."

"What," asked Lord Templewood, "are the dangers we are now facing?" "They are," he said, "certainly not naval, except to the extent that we need protection against submarines. The danger that we are facing . . . is a land danger from Russia. I speak of Russian policy as the sole military threat to the peace of the world in present conditions. Russian military aggression is the only military danger that at present threatens Europe. . . . It is freely said that Russia has an army of three million men that can move across Europe at will, and that the only possible obstacle in their way is the atom bomb. . . . I do not question the fact that twenty atom bombs could do irretrievable damage to Russia, but for their effective use supremacy in the air is essential. Apart, however, from the question of the atom bomb, I am convinced that for the years immediately before us a dominant Allied Air Force can hold up and disorganize any Russian advance. Russia is particularly vulnerable at two points—the point of its communications and the point of its oil supplies—just those two points upon which the Air Force demonstrated its power in the later years of the war."

The speaker quoted, from the Joint Statement made by the United States Air Force and the Royal Air Force in Europe at the end of the war, two passages which showed the devastating effect that air power can have upon communications and upon oil supplies:

(i) "The immense destruction done to all key-points on the railways of North-West Europe is well known. The effect on the mobility of the German reserves was disastrous, and the Allied build-up proved to be far more rapid than that of the enemy. The journey of two Panzer divisions from the Eastern front is a clear indication of the difficulties which the enemy had to face. The two divisions had raced across Germany in seventy-two trains, each division using three lines with twelve trains on each. But when they got to Nancy, in Eastern France, it was found that they could only proceed from there to Paris at the rate of eight trains a day instead of seventy-two. And even these eight trains did not get through to Paris," he remarked.

His second quotation from the Joint Statement dealt with the reduction of Germany's oil products as a result of bombing from the air:

(ii) "Before the campaign began, Germany had a normal monthly output of 1,344,000 tons of all oil products, and 532,000 tons of motor and aviation fuel. By September of 1944, the output of all oil products was down to 310,000 tons, 23 per cent. of the original figure, and of motor and aviation fuel down to 105,000 tons, 20 per cent. of the original figure."

Proceeding to suggest the kind of Allied Air Force that he believed would be capable of acting as an effective deterrent against aggression and as an effective instrument of European security, Lord Templewood said: "I contemplate an Allied Air Force to operate at the very beginning of a war of at least 100 jet-fighter squadrons, 150 latest type long-range bomber squadrons, 50 pilotless rocket units, and 150 transport squadrons. With a fully equipped and manned force of this kind I am convinced that the Allies could stop and disorganize any attempted advance across the Continent."

In conclusion, he said: "Throughout the greater part of the nineteenth century, the unchallenged supremacy of the British Navy was the most effective guarantee against a world war. It ensured the independence of the Latin-American Republics, it enabled the United States to develop its great resources, and, by maintaining the command of the sea, it made a world war impossible. The British Navy has still its vital part to play in keeping open the ocean highways. But for the years immediately before us, it is upon the Anglo-American Air Force that falls the chief responsibility of preventing a war."

Lord Templewood was followed by Lord Trenchard, who dealt with the recruiting situation and asked their Lordships to consider certain figures for the three Services recently published by the Ministry of Defence. "They show," he said, "how few (certainly, nothing like enough) recruits are joining the Royal Air Force. In fact the numbers are not within thousands of the total figures required . . ." And he quoted Lord Douglas of Kirtleside, who had said: "Unless urgent steps are taken to improve the rate of recruiting, it looks as if the Royal Air Force will before long die on its feet."

Asking why young men do not join the Royal Air Force in sufficient numbers, he offered four or five reasons, among them being the following:

(i) "During the last few years the Royal Air Force has not been in the public eye as it used to be." During the war, such great exploits as the Battle of Britain, Bomber Command's persistent and most effective raids over Germany, Coastal Command's share in overcoming the U-boat menace, and the vast air armada that prepared the way for, covered and supported the Normandy landings and the subsequent advance into Germany, had all received the publicity they deserved. "But after the war interest has seemed to wane."

(ii) Joining up means "sacrificing the advantage of taking up a civil profession early in life and entails being sent to different parts of the world . . . and there is little or no glory to be gained by a Regular front-line soldier, sailor or airman."

(iii) The anonymity which at present hides from the public many of the exploits of the Royal Air Force in peace-time, as when ten Vampires flew to America and back. Why not, asked Lord Trenchard, publish the number of the Squadron that does anything noteworthy, as the names of ships of the Royal Navy and regiments of the Army are published?

Emphasizing the importance of air power in war, Lord Trenchard said: "No formed bodies of troops can be moved by road or rail without air supremacy, and no ships can be moved at sea without air supremacy." And by way of illustration he instanced the German advances into Poland and Norway and elsewhere under cover of the air supremacy they then enjoyed. Without air supremacy, he added, we could never have invaded Normandy. Air supremacy held by the Western Powers was the only thing that could stop "Russia's vast army of millions of men and masses of equipment and aeroplanes pouring through Europe right into France and across France to the coast.

"I cannot believe," he continued, "that 500,000, 1,000,000 or even 2,000,000 men could advance without being stopped by the power of the Royal Air Force, backed by the power of the American Air Force. If we do not believe that, then how could we stop them? Is it practical, politically or economically, for ourselves and our Allies to put 1,000,000 men on the Elbe? As we know, it is not. It may be said that Russia advanced as far as Berlin in the last war with her masses of men and equipment, and that Germany could not hold her back. But why was this so? It was because Germany was completely disorganized by the attacks made by our air power, and because we had complete control of the air over Germany itself."

In conclusion, Lord Trenchard said: ". . . an Air Force up to full strength, equipped with the best and latest types of machines, is the only way to prevent war, or, if war should be forced upon us, of winning it. If your Lordships will give a lead to the Government and all the different Parties by saying unanimously that you realize it is the duty of all, if they want peace, to see that the Royal Air Force has all the support that it can from everyone in this country, to fit it in every particular to carry on the great work which it did in the 1939-45 war, and which it is still carrying on in Germany today, then I am convinced we shall not lack for recruits."

Lord Portal, in a maiden speech, dealt first with the recruitment of regular officers and airmen, and with the kind of encouragement that young men should be given to make a career in the Service. "Things must be so arranged," he said, "that, when it does occur to a young man of the right type to think of joining the Royal Air Force, and when he makes enquiries about his prospects and asks questions of his relations and friends, he will get encouraging answers instead of the kind of answers that I am afraid he too often now receives."

He then proceeded to consider the National Service men and said that it was idle to pretend that this very short service was anything but a most uneconomical use of manpower, particularly in view of the rapidly increasing complexity of modern aircraft. There were really only two courses open: "One is to raise the number of Regular recruits by proper publicity and, above all, by improved conditions, until the National Service element is reduced to very small dimensions. The other course is to increase the term of National Service for the R.A.F.—I emphasize 'for the R.A.F.'—to at least two, and, if possible, three, years, perhaps by the introduction of some form of voluntary ballot which would give a fifty-fifty chance of complete exemption and would carry with it appropriate financial compensation to the men who had to do two or three years."

Lord Portal also appealed for more continuity in policy, so as to ensure not only the right number of men but also the right proportion of trades; and he added: "It would be grossly unfair also to the officers charged with this enormous responsibility to expect them to produce sound and economical results if their plans are being continually chopped about in order to conform with changes in high policy. Let us have an adequate plan, as great as our resources allow, and let us stick to it."

Lord Balfour of Inchrye, following Lord Portal, also dealt with man power. He said: "The future for man power in the Royal Air Force is bleak. On the one hand we see technical entrants at Halton Training School buying out their discharges to an alarming extent. They will not go through with the training because they see greater rewards in civil life for technical trades such as those for which they are undertaking training. On the other hand we see numbers of the middle rank of officers, on whom we so much depend, resigning their commissions to an alarming extent. In another place, the Secretary of State for Air said that 117 Regular officers had resigned their commissions in the past nine months. Of that number, sixteen were wing commanders, twenty-four were squadron leaders and forty-six were flight lieutenants." And he added: "I believe that Service life, pay conditions and prospects, in relation to modern life outside the Service, does not appeal."

In conclusion, Lord Balfour said: "My Lords, I have tried to sketch briefly the reasons which I believe are responsible for the failure of the Services to attract the necessary technical personnel, and the reasons for the dangerous wastage which is going on in our first-line service of the Royal Air Force. The officers and men have no unions. They loyally serve the Crown, and they cannot speak with a united voice. They have to obey. If the nation wants a well-commanded flying service of contented men, skilled in their trades, the Government must give conditions for that career by raising the receipts of the men and women, by freeing their lives from the anxieties of constant moves, by a system ensuring secure employment after they have finished their Service life, and by a general uplifting which will make family life possible and happy for those in the Services (which it is certainly not at the present time) compared with what is possible for people outside."

The Cresta Run, St. Moritz

By Lord Brabazon of Tara

THE Cresta Run was entirely an English conception. It started as an ordinary snow run down the Cresta Valley and at that particular time, which is going back some forty years, the great contest was always between Davos and the Cresta. We went over to Davos and they came over to St. Moritz to race on the Cresta. As years went by the snow run became more and more defined, until now it is very stereotyped from the point of view of position, but though the corners, or "banks" as they are called, look the same every year they are different from the point of view of riding.

In the history of the Cresta there have been some quite distinguished airmen who have made a name for themselves. In the Golden Book of races in the past you will see the name of Captain H. Trenchard, who won the Novices' Cup from the Top in 1901. Captain Trenchard is now Marshal of the Royal Air Force Viscount Trenchard and he always, even today, takes a keen interest in the goings-on of the Run. After him I suppose the most distinguished is Webb-Bowen, now Air Marshal Sir Tom Ince Webb-Bowen, who was a very daring rider, especially from the Top, where he held the record for many years.

This Run, of course, is absolutely unique in the world and it has this very curious characteristic that once you have ridden it you are always one of a sort of sacred band who want to get back to it year after year.

Unlike bobbing, riding the Cresta is an early morning business at a time when you are not feeling your bravest and you only do it because you like going down, as there can be no applause from the crowd, as nobody at fashionable St. Moritz is ever up at that hour of the morning so there is nobody to cheer you on or applaud your exploits except your fellow riders.

The effect of the Cresta is very extraordinary. I have seen two people, total strangers and of different nationalities, walk up the Run asking what was the best way of taking this corner or that corner. They will remain friends for the rest of their lives. There is camaraderie about it which is extremely attractive.

Now let us see what we have to do to become riders. Generally the Run is open in three parts. First of all let me tell you it is about three-quarters of a mile long and the average gradient is one in seven and you finish at about 85 m.p.h., with your nose only three inches off the ice! This sounds very alarming, but curiously enough the very fastest speed is not very sensational. The bottom part of the Run, from what is called "Stream," is usually opened first of all, and that consists of a long straight bit and three rather inoffensive banks—not a difficult run. This in later years has been eliminated and we start at what is called "Junction." This is about two-thirds up. That is the most difficult part of the Cresta, but there is another third still to be added when you ride from the Top, but that takes place in

Face page 48

Lord Brabazon of Tara
at St. Moritz, 1948.

Lord Brabazon of Tara,
Cresta Run, 1938.
"Battledore."

the later part of the season. The problems presented when riding from the Top are not very different from those from Junction. Junction, however, introduces the technique of fast starting, which is quite tricky—a young man's job.

The toboggan, you will see from the photograph, consists of two steel runners upon which is a sliding platform, upon which you rest. You hold this platform of the toboggan ten feet behind the starting line and then you push and run by the side of it until you cannot run any faster, whereupon you flop on to it. You have broken the thread that starts the clock, and if you are a good rider you have got on fast and true and it is very essential to get on true, because if you don't run true during the time when you are running rather slowly on the general gradient at the beginning, you will lose much time. It is an art difficult to acquire, and as you get on in years and are less flexible, it is very difficult to do a fast start. However, we are now on our toboggan and increasing every moment in speed until we come to the first corner, which is called "Rise." This one can take with one's body right forward on the toboggan and at the end of it you come to what is a very formidable corner—"Battledore." If you don't look out there is trouble here, because "Battledore" must be taken not too high and rather long. In other words you must not try to get off it too quickly, nor must you go too high on it. As you come round "Battledore" you are presented with the horror of having to go round "Shuttlecock." "Shuttlecock" is a long corner or bank to the left and it is less than a right angle, so that you can see there is quite a considerable number of degrees that have to be turned. The secret of it, however, is to have used "Battledore" to get up early and high on to "Shuttlecock." A good rider you will find gets up as early as he can and as high as he can and then sits pretty with something in hand until he comes to what is a sort of crisis in the Run, which you feel instinctively. Suddenly you know that danger is over and you pull yourself forward on the toboggan. You come off on to a corner which rarely presents difficulties, namely, "Stream," which bears you into a long straight of about 150 yards. There you fairly hurtle down under a bridge and then on to a corner called "Bulpetts," to the right, which you can take riding forward, as also "Scylla" and "Charybdis," corners to the left and to the right. As you come off "Charybdis," which is the last corner, you come to a short straight to the finish and here you actually leave the ice for a yard or two before coming to the downhill run to the finish, after which there is a steep hill up which swings to the left, and here you rake and come to rest, extremely exhausted and out of breath, as the change from coming down to going up gives you about 2¼ g. in your stomach right at the bottom and takes the wind out of you. Altogether riding the Cresta is the most pleasurable and enjoyable amusement one can ever think of indulging in.

I have not described, I confess, the technique of taking corners. When you start you get on your toboggan with the sliding platform forward and yourself poised on it with your nose about a foot and a half forward from the cross bar of the toboggan. When you come to a corner—let it be one that turns to the right—you push yourself back on the sliding platform, leaving the left arm forward and bringing the right arm back. Now the weight is on the back of the toboggan and right at the end of the runners there are grooves and as you press round to the right with your left hand, so you will steer to the right and not slip because of the grooves in the runners. This position is held during most of the corners, but the moment they are over, then you pull yourself forward and are on the non-grooved part of the runners, which, of course, is the fastest method of riding.

There are now certain laid-down regulations as to dress, all of which is lent you by the Club. Your boots must have spikes screwed on to them and don't forget that your boots are your only brakes. If you trail them hard behind you, then you diminish your speed very materially. You have enormous knee pads, enormous pads on your elbows, pads on the back of your gloves and a very big crash helmet, and let me assure you every one of them is wanted, as there are few forms of sport that I know of in which you can get knocked about more without having a fall than going down the Cresta.

When you begin you get on your toboggan and you trail your feet hard and you go down quite easily and get safely to the bottom without any trouble whatsoever, after which you will go down with less braking and finally you will find yourself getting into the class where you are within two or three seconds of the great riders and it is from this point that the real danger in riding the Cresta exists as, due to trying to go faster than you can, many disasters occur. The first thing is to get really used to riding and not to be afraid, and become so familiar with the course as to be able to impose your will upon your toboggan. This sounds easy, but I assure you sometimes at speed it is not. When I tell you that I once won the Curzon Cup with an aggregate of six runs by a tenth of a second, you will realize how keen and close is the competition!

The two great races are the Curzon Cup, which is the aggregate of six courses from Junction, and the race from the Top, called the "Grand National." This race embodies a very steep bit consisting of three rather terrifying corners above Junction, but the start is very steep, so that the technique of starting does not play such a prominent part. You do, however, come to the corners after Junction at a higher speed than when you start from Junction, and this presents problems of adjustment of speed—very difficult to assess sometimes when the ice is fast or slow.

I hope many of you in the Royal Air Force will try this Run. I am sure there is not one of you who will not fall in love with it and speak of it all your lives and consider your fellow riders as nothing but your friends.

I need scarcely say that all equipment is provided out there so that all that is wanted to start is a willingness to try and, as I have said before, once you have made up your mind to do this—and done it—you will be one of a great big family of Cresta riders all over the world, and they are a good crowd.

The R.A.F. Mountaineering Association

THE R.A.F. has taken very kindly to mountaineering; a sport which seems to be particularly suitable to the Service from every point of view. Although only founded in January, 1948, the Association already has nearly eighty members and has enjoyed a most active and successful first year of existence.

Under the energetic direction of Flight Lieutenant Richardson Jones, R.A.F.M.S., the Meets Secretary, several attractive climbing meets have been held in North Wales and the Lake District—one of which was arranged for the special instruction of complete beginners. Then in August a party of twelve (which included the Chairman, the Equipment Secretary (Squadron Leader Hiscocks-Haig), and some members of the Cranwell Mountaineering Society) went to Switzerland, where they spent an active fortnight at Saas-Fee in the Valais, one of the finest mountaineering centres in the Alps. In spite of exceptionally bad weather which persisted nearly all the time, with the assistance of local guides they managed to climb several of the fine peaks which surround this beautiful valley.

Part of the success of the Association's activities is probably due to the large fund of mountaineering experience and knowledge possessed by its officers. For instance, the President, Air Marshal Sir Ralph Cochrane, is an expert ski-runner and is interested in anything to do with mountains; as regards the three Vice-Presidents, Air Vice-Marshal A. P. Ledger is a keen and competent ski mountaineer; Lord Malcolm Douglas-Hamilton recently ascended Mount Kenya and has climbed in the Alps, Scotland and Skye, while Mr. F. S. Smythe is the distinguished Everest and Himalayan explorer and writer, who has done much pioneer mountaineering in many parts of the world.

The Chairman, Wing Commander A. J. M. Smyth, during the war commanded the Air Crew Mountain Centre, Kashmir, and has climbed widely in the Alps and in this country. The Vice-Chairman, Wing Commander E. B. Beauman, ex-President of the Alpine Ski Club, is a well-known mountaineer and ski mountaineer who took part in the Kamet Expedition to the Himalaya in 1931, and made the first crossing of the Coast Range of British Columbia (partly on ski) in 1934. He has also climbed most of the big peaks in the Alps, including five ascents of the Matterhorn by various routes. The Secretary, Squadron Leader P. Caddy, has made a number of small expeditions in the Himalaya and has also climbed in this country.

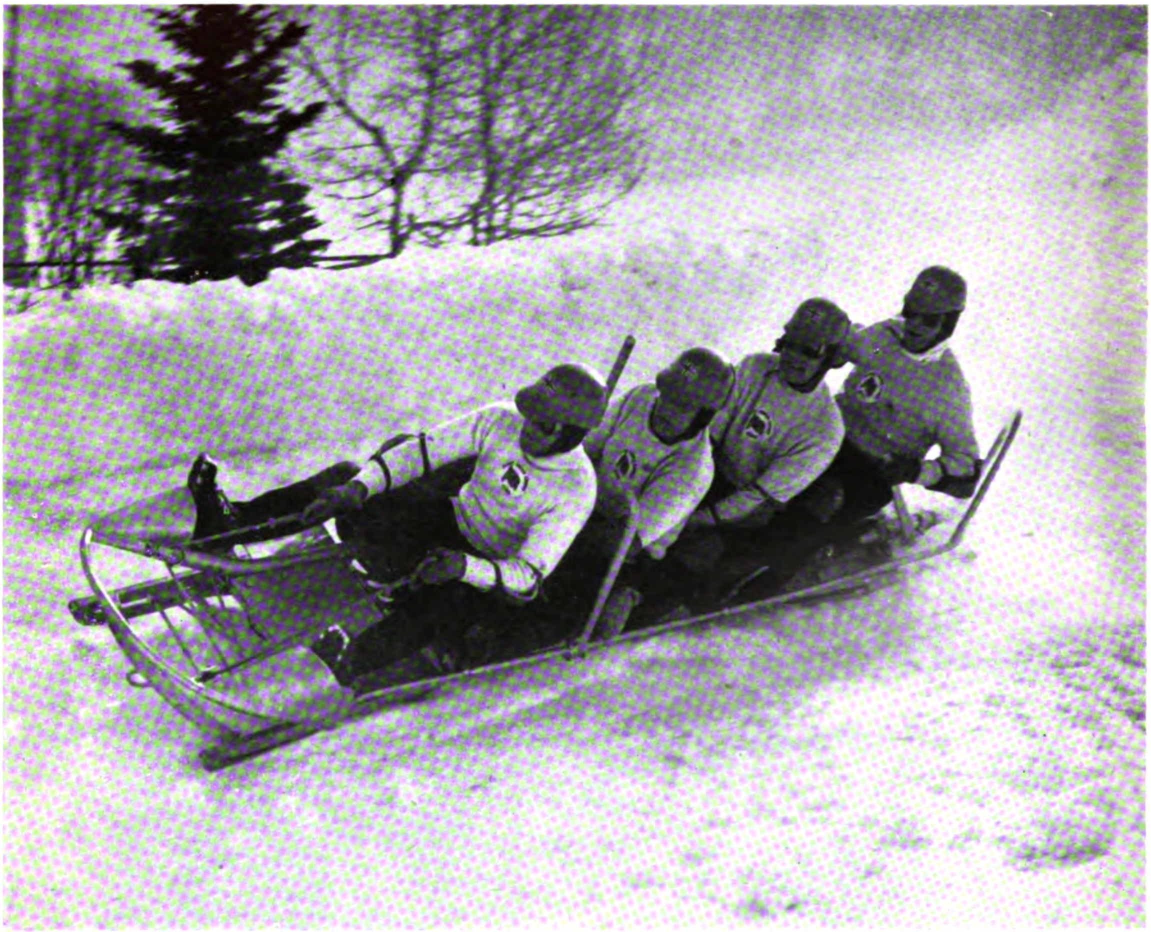
At the same time it is interesting to learn that, in order to join, previous experience of mountaineering is quite unnecessary—one of the main objects of the Association being to train its members in all branches of the sport.

The Association has several ambitious schemes in view for the future, including a meet in the French Alps next summer, and a combined ski-ing meet with the R.A.F. Winter Sports Association in Scotland next spring.

May this enterprise continue to prosper.

"Per Ardua Ad Astra."

Face page 50



Olympic Four-Man Bob Event.
The British No. 2 team: S./Ldr. R. Jeffrey: W.O. E. J. Meddings: W./Cmdrs. G. Powell-Sheddon and J. Iremonger, competing in the Olympic Four-Man Bob Event.

Winter Sports for All Ranks

IT may not be widely known that since 1946 there has been in existence a Royal Air Force Winter Sports Association. One of its first activities was to form two bobsleigh teams, which went to Switzerland to compete in world championships. Not only was valuable experience gained by this venture but a certain amount of success, in that they won the Gold Cup. The following year the R.A.F. team represented Great Britain in the Olympic Sports and secured fifth place.

The Association has arranged winter holidays in Switzerland in six fortnightly periods to enable members of the Service—all ranks and W.A.A.F. as well as R.A.F.—to spend a fortnight's holiday at St. Moritz, as part of their ordinary leave. The inclusive cost is £36 10s. per head, which covers fares, hotel accommodation, meals, instruction in all winter sports, and the hire of sports equipment. The first party for the season 1948-49, numbering sixty and including Group Captain R. W. F. Collings, Chairman of the Association, arrived at St. Moritz before Christmas. Air Marshal Sir Cyril Cooke, Air Officer Commanding-in-Chief, R.A.F. Maintenance Command, is accompanying the party leaving for Switzerland at the beginning of February.

An ice-hockey team has recently been added to this Association. With two exceptions, all the members are Canadians who have played ice-hockey in their own country and who served in the R.C.A.F. during the war. One of them, Flight Lieutenant W. Taylor, is still on R.C.A.F. duties in London, the others joined the R.A.F. after their release. The captain of this team is Flight Lieutenant D. G. Evans, who came to this country before the war and finished his education at Fairfield Grammar School, Bristol.

Ski-ing and the R.A.F.

By Group Captain T. F. U. Lang

BRITISH ski-ing became generally popular after the First World War—although history has recorded many instances of "snowmen" as early as A.D. 526-559, when references were made to "gliding Finns" in contrast to those who did not "glide" over the snow. Whatever the reason for the popularity of ski-ing it has always had a large following among the R.A.F.—some of whom have had very distinguished careers both on the snow and in the air.

The reason may be that ski-ing and flying would appear to have much in common; man's desire for more and more speed coupled with the exhilaration of conquering the forces of nature, whether on the ground or in the air, has always had its exponents. Similar qualities, namely, perfect balance, flexibility, courage and determination are required both for ski-ing and for flying. There is an even greater similarity between ski-jumping and flying than with downhill ski running—even a modest ski jump of 15 metres, supported and controlled aerodynamically by only the aerofoil of the body, hands and the skis, is the closest resemblance to flying without wings. The world's record ski-jump is held by a Swiss with the colossal leap of 120 metres on the famous Planica jump in Yugoslavia during 1948. The longest ski-jump by a British skier was made by Guy Nixon in 1931 with a distance of 61 metres. Even the feeling of speed when ski-ing downhill on perfect snow under complete control is almost as sensational as flying the fastest jet aircraft. In 1924 a new world record was made by an Austrian on a specially prepared runway with the impressive speed of 124.5 kilometres per hour. Five British skiers recorded times of over 60 m.p.h. on the same course.

Of the ski-ing personalities in the Royal Air Force perhaps Air Chief Marshal Lord Dowding, G.C.B., G.C.V.O., C.M.G., who was Air Officer Commanding-in-Chief of Fighter Command from 1938 to 1941, can be considered the father of R.A.F. skiers. He was a complete enthusiast and in 1922 passed his First Class Test.

In his early ski-ing days he pioneered many high Alpine expeditions in winter and spring, including the Monte Leone ascent on ski in the winter of 1922 and the high traverse of the Jungfrau in the spring of 1923. He was also a prominent racer at the tender age of fifty! Lord Dowding was President of the Ski Club of Great Britain in 1924, and still takes an active interest.

Of the other early R.A.F. ski-ing veterans the name of Air Commodore E. M. Maitland, C.G.G., D.S.O., A.F.C., President of the Ski Club, in 1920, will always be remembered both for his prowess in ski-ing and for his self-sacrifice when the airship R38 crashed into the Humber in 1921. His body was found alongside the water ballast control, and the coroner's subsequent observation read ". . . therefore the final act of this gallant officer was directed to doing what he could to save his vessel and his crew."

Of those born during the present century there were many "whose name liveth evermore." Among others the mention of David Waghorn, Tony Knebworth and Roger Bushell will always be associated with happy memories of flying and ski-ing. Each in his turn was an expert of both arts. Flight Lieutenant Waghorn, a Regular who won the Schneider Trophy Race in 1929, was a First Class skier and a prominent ski racer. He was killed in a flying accident at Farnborough in 1931. Viscount Knebworth was a member of one of the Hendon Auxiliary Squadrons and represented Great Britain at the first International Ski race against the Swiss in 1925. He was always a friendly rival of David Waghorn, as they lived on the opposite slopes of the precipitous Lauterbrunnen Valley and competed against each other in first-class ski races on many occasions. He loved ski-ing and had a delightful sense of humour, including the epic occasion when he entered for a ladies' ski race, suitably attired, and for a short time caused consternation among the other competitors. He was killed while practising for the Hendon Display in 1933.

More recently the name of Squadron Leader Bushell, also Auxiliary Air Force, has become almost immortal among all those who knew him on the snow, in the air and during his captivity in Stalagluft III, having been shot down over the Channel in 1940. An energetic and voluble skier he tackled everything in the same resolute manner, whether it was a downhill, slalom, langlauf or ski-jumping contest, filling the Alps with his voice, either yodelling with joy or commenting hotly on the hazards which he had encountered. He was also classed among the *élite* British skiers in Europe, and the Swiss have perpetuated his memory by naming a famous downhill course at St. Moritz after him.

No less courageous in the air, and belonging to the rising generation of British International skiers can be added several names. Viscount Carlow—who commanded one of the Hendon Auxiliary Squadrons before and during the war—was killed while flying out to the Middle East. Anthony Palmer-Tomkinson, R.A.F.V.R., one of the most promising of the younger skiers and brother of the captain of the British Olympic Ski Team in 1948, was killed over France in 1942. William Rhodes-Moorhouse—an auxiliary pilot and son of one of the first holders of the Victoria Cross in the Royal Flying Corps during World War I, was killed in 1940. Mention could be made of many other R.A.F. skiers who were killed in the last war; of the two hundred and ten members of the Ski Club of Great Britain who gave their lives, fifty-six belonged to the Royal Air Force.

The most prominent name to be recorded on the Roll of Honour is that of His Royal Highness The Duke of Kent, who, although he never had an opportunity of learning to ski, took a great interest in British ski-ing by permitting his name to be associated with the competition for a special downhill race, now known as the Duke of Kent Cup. He became an Honorary Member of the Ski Club of Great Britain in 1939.

Today there are still many skiers in the R.A.F. who visit the snows of Europe yearly for their leave. Among the Air Marshals can be included Sir Ralph Cochrane, a First Class skier, Sir Alec Coryton, Sir Leslie Gossage, Air Vice-Marshal Borton, Air Vice-Marshal Foster, Air Vice-Marshal Gibbs, Air Vice-Marshal Ledger and Air Commodore Clappen. These officers can be considered the senior veterans of R.A.F. ski-ing. If the R.F.C. skier is to be included then the name of H. R. Spence, M.P. for North Aberdeen, must be recorded as a First Class skier and racer.

Widely known internationally is Wing Commander Bentley Beauman, President of the Alpine Ski Club for many years, who has done much to enhance the name of the Royal Air Force among skiers of all nations. He has made numerous winter ascents in the Alps and skied in the Himalayas at 20,000 feet, as well as in the Coast Range of B.C.

This officer of the R.A.F. has done more ski mountaineering than anyone in this country and his exploits have been such that they would make a book full of interest.

Among the non-air-rank "brigade" there are several officers who were considered of International standing before the 1939 war, competing in a variety of championships in different corners of the earth—stretching from Canada south and east to Chile, India and the Antipodes. Group Captain "Paddy" Green—an Auxiliary officer and an ex-university ski-team member—has raced in Canada and most European countries where snow is to be found. Group Captain The Honourable Max Aitken, another Auxiliary, has been a keen skier for many years. Both officers' war records during the Battle of Britain and in the Mediterranean are well known. The author modestly classifies himself in the same category of ski-ing with nineteen years' ski-ing and racing in European countries, India and Australia. Wing Commander Kenneth Smith, R.A.F.V.R., also an excellent skier and renowned for his active ski mountaineering and technical experience on snow craft. Frank Smythe, well known as the outstanding British mountaineer, particularly in the Himalayas, joined the Royal Air Force for the duration of the war. Of the rising generation there are many junior officers whose names may one day be added to the list of outstanding British skiers.

From the Royal Naval Air Service the name of Alexander Kieller must be included among the founders of British ski-ing. In particular, he was instrumental in popularizing ski jumping and landglaf among British skiers. President of the Ski Club of Great Britain in 1931, our very satisfactory record in international ski-ing contests was due, to no small extent, to his enthusiasm.

This increasingly popular sport has always had enthusiastic support from the fair sex. From those who are ex-W.A.A.F. or still serving the names of Wing Officer E. Kirkpatrick, of Bomber Command, and Squadron Officer P. Farquharson must always be associated with ski-ing. Both have had considerable experience on glacier expeditions, and the latter has passed her third class ski-jumping test and skied in Australia and New Zealand. Without adequate records it is not possible to mention all those skiers who are or have been connected with flying, but it is hoped that those who are will use the correspondence column of the R.A.F. QUARTERLY to remind us of omissions, by writing to the Editor.

As overseas postings are inevitable in the Royal Air Force, few may be aware of the many places where suitable snow can be found—the mountains of Cyprus, the vale of Kashmir, the Himalayas, and the Alps of Australia and New Zealand provide adequate ski-ing areas. In the New World the mountain ranges of Alaska, Canada and the United States offer ski-ing which would satisfy the most exacting connoisseur. In contrast the posting to a Home establishment or to B.A.F.O. inevitably embraces the thought of ski-ing even in England and Scotland, during a severe winter, as well as in Scandinavia and most of the other European countries west of the Iron Curtain.

This record of officers who have "lived dangerously" in the past is undoubtedly a challenge to those of the present generation of R.A.F. who follow them to maintain this tradition in a field of sport that demands the same nicety of judgment and courage that is so necessary to those who serve their country in the Royal Air Force.

Brief Notes on Other Sports

THE Royal Air Force won the Singapore Inter-Services 1948 Swimming Championships, gaining 74 points against the Army's 64 and the Navy's 63. Lady Gimson, wife of Sir Franklin Gimson, Governor of Singapore, presented the prizes.

* * *

An all-round sportsman, Air Vice-Marshal F. J. Murphy, C.B.E., recently appointed as P.M.O. of the R.A.F. Mediterranean and Middle East Command, was, in his younger days, one of the finest hockey players in the R.A.F. In four successive years, 1925 to 1928, he captained the R.A.F. teams which played against the Navy and Army. He also played lawn tennis for the R.A.F. and is a member of the R.A.F. Golfing Society.

* * *

The R.A.F. and W.A.A.F. Junior Championships-at-Arms is another sport contest where exceptional keenness is shown by all participants. The competition is in all weapons—foil, épée, sabre and bayonet—and the competitor gaining the highest aggregate score becomes the R.A.F. Junior Champion-at-Arms for the year, during which he holds the Birch Shield. The W.A.A.F. contest in 1948 was in foil only.

A Voyage to Port Said

By Sergeant M. E. Keegan, W.A.A.F.

I DID not volunteer for overseas service, but was one of those people who sat smugly in a Section in the United Kingdom with a very interesting job, a civilian billet and never a thought that one day fate might root me out and place me on an overseas draft. It did, though, and when the news reached me I was not at all pleased.

Having cleared from my unit and reported at the P.D.C. the idea began to sink in, and in spite of the many ups and downs I began to think that it might not be so bad after all. That does not mean I was pleased about the whole business—I resented it furiously.

At last the day came when we boarded the *Empress of Australia*, took our last glimpse at dear England, and sailed. The ship was all that one could desire; she was nearly 22,000 tons, and just to see her from the quayside sent an exciting feeling through me, and my former resentment seemed to be dying slowly but surely. I realized that here was a chance that I could never have had at my own expense, so I made up my mind to take it and enjoy it.

Our cabins accommodated ten girls, with plenty of space to move about and lots of room to unpack the things required on the voyage. The food was perfect and plentiful and there was a great variety of entertainment aboard.

Sea is just sea for the first few days, then, having ventured the Bay of Biscay, which was very calm, the weather changed, the sun shone, we dressed in sun suits and frocks, and best of all were the happy smiles that began to appear on the faces of my fellow travellers.

Our first stop was Malta. We arrived at about 10 a.m., and I could never describe the wonderful excitement that filled me as I stood on the boat deck and watched Malta, with its wonderful blue sky and its strange white and somewhat battle-scarred buildings perched defiantly on the surrounding hilly district, all of which stretched down to the calm blue waters dotted with merchant and Royal Navy vessels, and tiny boats perkily forcing their way through littered with colourful wares, sweets and fruits.

On again, more water, which seemed to change from a light blue to an almost navy shade, and then to various colours and green. Mostly at night-time, when vision was not bad, the coast line of North Africa appeared. It was good to see land, even at a distance. Then we reached Piræus, in Greece. We sailed in there through the morning mist with the sun gently breaking through the clouds. It was a quiet, sleepy place just then; no vendors or noise, except for our own troops disembarking. Piræus is built on a hill, too, much like Malta, but more modern and more thickly populated.

Next stop Salonika. A proud, haughty-looking place far more civilized than either of the former. From where I stood the streets looked clean and the atmosphere very business-like. The climate was very warm, but in spite of all I would not have put it before dusty, sandy Malta.

We pushed on again; I was really excited and thoroughly enjoying my holiday by now and I had fully forgiven the Royal Air Force and those concerned with drafting me.

Port Said! We arrived there about 10.30 a.m. Excitement broke out everywhere as we sailed up the Canal, not knowing which way to look for fear we would miss something. It is a sight I myself will never forget. Ships littered all over the place, with passengers waving to us, hooters going and the natives out in their little boats awaiting big business. Everything was so colourful and the dress of the natives, the sight of the palm trees, oriental buildings and structures, the strange names and signposts and the strange language and the heat; indeed my world was upside down. It was like a dream or sitting in a cinema watching a travelogue film and thinking that any moment it would end and I would be sorry.

When we came ashore the currency situation was a bit bewildering, but willing old stagers helped us to sort that out successfully.

Having finished the welcome refreshments, I gazed around me in wonder at it all, sorted myself out and sat down. I realized that I was out of a rut once more; I had come all this way and seen things that I could only have dreamed about; my outlook and education had advanced further; I had had twelve days' holiday at no financial cost to myself. Eighteen months of wonder lay ahead of me, complete with things I wouldn't like, no doubt, but on the whole I'd enjoy it, and one day return to my beloved England and cherish her all the more and be thankful that fate had given me this wonderful chance. Already I am happy in my heart and I know I am glad I came.

Concerning Personnel

AMONG new appointments made since the October Number of the R.A.F. QUARTERLY was issued were the following:

AIR FORCES WESTERN EUROPE

Air Marshal Sir James Milne Robb, K.B.E., C.B., D.S.O., A.F.C., to become Air Chief Marshal, on his appointment as Air Commander-in-Chief, Air Forces, Western Europe.

AIR MINISTRY

Air Marshal Sir Arthur P. M. Sanders, K.B.E., C.B., to be Vice-Chief of the Air Staff.

Air Vice-Marshal Somerled Douglas Macdonald, C.B.E., D.F.C., to be Assistant Chief of the Air Staff (Training).

Air Vice-Marshal Charles Edward Neville Guest, C.B., C.B.E., as Assistant Chief of the Air Staff (Operations).

Air Commodore G. E. Nicholetts, A.F.C., as Director of Organization.

Brigadier M. A. James, V.C., D.S.O., M.C., to be Director of Ground Defence.

Air Commodore F. W. Long, C.B., as Director of Operations.

Air Commodore C. M. Heard, C.B.E., as Director of Weapons.

Air Commodore J. D. Baker-Carr, A.F.C., after a year as Deputy Director of Postings, Air Ministry, has been appointed as Director of Armament Research Development (Air) at the Ministry of Supply.

FIGHTER COMMAND

Air Vice-Marshal Gilbert Harcourt-Smith, C.B., C.B.E., M.V.O., to be Air Officer Commanding No. 12 Group.

Air Commodore V. G. A. Hatcher, O.B.E., A.F.C., as Chief Signals Officer at Headquarters, Fighter Command, *vice* Air Commodore R. L. Phillips, C.B.E., appointed S.A.S.O., at No. 90 Group.

Air Commodore Vyvyan Stewart Ewing to be P.M.O. at Headquarters, Fighter Command.

MAINTENANCE COMMAND

Air Vice-Marshal Harold Jace Roach, C.B., C.B.E., A.F.C., to be Air Officer Commanding, No. 41 Group.

Air Vice-Marshal Hugh Granville White, C.B.E., to be Air Officer Commanding No. 43 Group.

Air Vice-Marshal Thomas Cathcart Traill, C.B., O.B.E., D.F.C., as Air Officer i/c Administration, H.Q. Maintenance Command.

TECHNICAL TRAINING COMMAND

Air Vice-Marshal Colin Winterbottom Weedon, C.B., C.B.E., to be Senior Air Staff Officer at H.Q. Technical Training Command.

RESERVE COMMAND

Air Vice-Marshal Robert Owen Jones, C.B., A.F.C., as S.A.S.O. H.Q. Reserve Command.

R.A.F. STAFF COLLEGE

Air Commodore Harold Vivian Satterly, C.B.E., D.F.C., as Assistant Commandant.

B.A.F.O., GERMANY

Air Marshal T. M. Williams, C.B., O.B.E., M.C., D.F.C., to be Air Officer Commanding-in-Chief.

Air Commodore F. E. Vernon, C.B., O.B.E., as Senior Technical Staff Officer.

Air Commodore C. J. Luce, D.S.O., as Command Defence Officer.

FAR EAST COMMAND

Air Commodore Adolphus Dan Davies, C.B.E., as A.O.C. Hong-Kong.

Air Vice-Marshal F. J. W. Mellersh, C.B.E., A.F.C., as Air Officer i/c Administration, H.Q. Far East Command.

MIDDLE EAST COMMAND

Air Commodore G. H. Flinn, C.B.E., as Air Officer i/c Administration at No. 205 Group.

Air Commodore H. A. Constantine, C.B., C.B.E., D.S.O., as S.A.S.O. at No. 205 Group.

New Year's Honours and Promotions

K.C.B.

Air Marshal John Wakeling Baker.
Air Marshal Aubrey Beauclerk Ellwood.
Air Marshal John Whitworth Jones.

K.B.E.

Air Vice-Marshal John Whitford.

C.B.

Air Vice-Marshal P. H. Mackworth.
Air Commodore E. D. Barnes.
Air Commodore C. N. H. Bilney.
Air Commodore G. E. Nicholetts.
Air Commodore A. H. Robson.
Air Commodore H. V. Satterly.
Air Commodore A. W. B. McDonald.
The Rev. J. A. Jagoe.

C.B.E.

Air Commodore E. S. Burns.
Air Commodore B. E. Essex.
Air Commodore J. G. Franks.
Group Captain P. E. Berryman.
Group Captain W. G. Cheshire.
Group Captain J. Mutch.
Group Captain E. G. Northway.
Group Captain V. H. B. Ruth.
Group Captain B. C. Yarde.
Group Captain J. C. Sisson.

D.B.E.

Matron-in-Chief Miss Gladys Taylor.

R.R.C. (FIRST CLASS)

Matron Roberta M. Whyte.

R.R.C. (SECOND CLASS)

Senior Sister Dorothy M. Schilling.

O.B.E. (MIL.)

Wing Commander R. J. Abrahams.
Wing Commander S. G. Birch.
Wing Commander N. G. N. Davis.
Wing Commander F. Garrod.
Wing Commander J. S. G. Gibbs.
Wing Commander H. S. Grimsey.
Wing Commander S. R. C. Nelson.
Wing Commander R. P. O'Donnell.
Wing Commander G. F. A. Skelton.
Wing Commander P. G. Wykeham-Barnes.
Wing Commander S. Black.
Wing Commander K. F. Mackie.
Wing Commander W. G. Parry.
Squadron Leader W. Appleby-Brown.
Squadron Leader E. S. Bishop.
Squadron Leader H. S. Corfield.
Squadron Leader A. McC. Johnstone.
Squadron Leader G. E. Lovett-Campbell.
Squadron Leader E. C. Rideal.

R.A.F. PROMOTIONS

The half-yearly promotions published in the *London Gazette* of 31st December, 1948, include the following:

Air Vice-Marshal to Air Marshal

J. W. Baker, C.B., M.C., D.F.C. (Acting Air Marshal).
Sir Hugh S. P. Walmsley, K.C.I.E., C.B., C.B.E., M.C., D.F.C. (Acting Air Marshal).

Air Commodore to Air Vice-Marshal

F. J. W. Mellersh, C.B.E., A.F.C. (Acting Air Vice-Marshal).
T. C. Traill, C.B., O.B.E., D.F.C. (Acting Air Vice-Marshal).
G. Harcourt-Smith, C.B., C.B.E., M.V.O. (Acting Air Vice-Marshal).
G. H. Mills, C.B., D.F.C.
A. Hesketh, C.B., C.B.E., D.F.C.
W. A. D. Brook, C.B.E.
H. J. Roach, C.B., C.B.E., A.F.C. (Acting Air Vice-Marshal).

Group Captain to Air Commodore

R. N. Waite, C.B.E.
F. R. D. Swain, C.B.E., A.F.C.
R. Coats.
A. W. B. MacDonald, A.F.C.
H. I. Cozens, C.B., A.F.C.
L. de V. Chisman, D.F.C.
R. J. Rodwell, C.B.
F. G. S. Mitchell, O.B.E.
V. G. A. Hatcher, O.B.E., A.F.C.
C. A. Bell.
G. L. Worthington, C.B.E.
E. C. K. H. Foreman, C.B.E., M.R.C.S., L.R.C.P.
J. MacC. Kilpatrick, O.B.E., M.B., B.Ch., D.P.H.

Editor's Notes

As this is the New Year number we wish all our contributors and readers prosperity and happiness throughout 1949.

CORRESPONDENCE COLUMN

In the October number we expressed a hope that readers of the R.A.F. QUARTERLY would send letters to the Editor for publication, commenting upon the various articles in the previous issue of this Journal.

In any gathering where conversation turns on "shop" there are usually as many opinions as there are men present. The QUARTERLY, which is a professional semi-official publication and not by any means an official handbook, should reflect this.

The most fertile garden of controversy in a paper or journal is the correspondence column: *The Times* is, of course, a classic example. We think that a vigorous correspondence column would be a useful and popular item in the R.A.F. QUARTERLY, and express the hope that a lead will be given by air officers of our Service without delay. It is to them that we look for new ideas and guidance of thought on the many subjects dealt with in these pages. Every article on a professional subject must arouse a measure of disagreement in some if not all readers, which could not be expressed in less space than another short article. In an instance of this nature, the original should be followed, in the next issue, by one or more of the controversial opinions.

We dealt under "The News Summary" in the October Number, with the dismantling of the last giant airship hangar at Pelham Air Station, and not only headed the item as "The End of the Airship Era," but suggested that airships had now gone to join Dædalus. This was sufficiently provocative to bring another opinion at once, entitled "Will the Airship Return?" for which we are most grateful, and it is included in this issue of the Journal.

In this, the January Number, we suggest that there are articles which, whilst not particularly provocative, only give the author's views on controversial subjects. Among them are "The Crow and the Mole," "Will the Airship Return?" and "Aviation History, 1903 to 1960." The last mentioned is by a well-known American aircraft designer and engineer. We are sure that there are many who will disagree in some measure with the opinions expressed. Let them take up their pens now and we hope that among them will be some senior officers of our Service who will prevent us from becoming "one-track minded" in these matters.

THE APRIL NUMBER

A forecast of what we hope to include in the next (*i.e.*, April) number of the QUARTERLY may be of interest to readers.

The first of a series of articles dealing with life today on R.A.F. Stations will appear depicting "Life on a Bomber Station in the U.K.," with suitable illustrations.

The article in the current number entitled "The Provost Branch" will be followed up by a description of "The Education Branch," also illustrated.

Another new series will begin entitled "Autobiographies of Famous Airmen," by a well-known writer.

Part II of "The Influence of Modern Technique of War on Strategy" will be in the next issue, as will be a follow-up of the series "The Air Forces in Parliament." If enough material is received, a new section entitled "Our Empire Air Forces" will be introduced, and, we hope, a correspondence column.

TO FUTURE CONTRIBUTORS

Risking a reproof for repetition, may we say again that it is hoped to establish the R.A.F. QUARTERLY as a forum in which personnel of the air forces can put forward their ideas on air matters, and in particular on general matters of war as seen through their eyes? What is needed is information which cannot be obtained from any other paper, journal or book. Readers want the original ideas of others in the Service. There is so much to read these days that it is irritating to read something which is already well known. If a writer has received considerable help on a subject from some particular book or recommends a book as being the standard work on that subject it is helpful, but we have had, on occasions, to be drastic with our blue pencil where a long list of "Bibliography" has been included.

The R.A.F. QUARTERLY is read in many parts of the world and some articles have been republished in American Service Journals. It is important, therefore, that fresh opinions and new ideas should be forthcoming to stimulate discussion on as many matters as possible connected with our Service.

FUTURE CONTRIBUTIONS

There are still many fields of interest not yet covered by contributors. We should like to consider articles from the Fleet Air Arm, or one giving an insight into "The Industrial Backing" without which no air force can exist. With Anglo-American co-operation becoming more vital every day, an article dealing with current events in this co-operation would undoubtedly be of great interest to all.

R.A.F. FLYING CLUB

Membership of the Club, which has its headquarters at Panshanger, Herts, and a branch at Wolverhampton, is open to past and present Air Force officers. N.C.Os. may become associate members. The Club provides wider flying facilities than are available with Service aircraft, such as the carrying of civilian passengers and private overseas touring. It has Moth Minor and Auster aircraft, and if there is sufficient demand branches may be opened in other parts of the country.

No. 1 RESERVE FLYING SCHOOL'S SILVER JUBILEE

With some 440 volunteers recruited, this School leads the country in the number of R.A.F.V.R. and W.A.A.F.V.R. flying personnel under training. Its strength is now 347 pilots (twelve of whom are W.A.A.F. Volunteer Reservists), forty navigators and twenty-three signallers. In addition to these numbers thirty-three pilots have been transferred to schools nearer their homes.

FALCON EXPERIMENTS CONTINUED

Experiments with falcons to discourage birds from flocking over R.A.F. airfields were resumed at the end of 1948. Last year thirteen aircraft accidents in this country, and seventeen in other parts of the world, were caused by birds.

ACCIDENT PREVENTION TROPHY

1949 is the first occasion for the presentation of this trophy (a silver model of a Halifax Mark III bomber) to the flying station in R.A.F. Transport Command having the lowest aircraft accident rate for the year. The trophy was originally presented by Messrs. Handley Page Ltd. to Headquarters No. 4 Group, Bomber Command, which flew Halifaxes during the war. It stood in the Headquarters Mess at York. No. 4 Group was later transferred to Transport Command and eventually disbanded.

GLIDER TRAINING

41,250 glider launches were made during July, August and September last year at the fifty-three Glider Schools in the R.A.F. Reserve Command, during which 612 members of the A.T.C. passed their glider test, making a total for that year of 1,537.

A.O.C.-IN-C., R.A.F. FLYING TRAINING, VISITS U.S.A.

Air Marshal the Hon. Sir Ralph A. Cochrane visited the U.S.A. in the latter part of 1948, to lecture at the U.S.A.F. Air University and to carry out liaison visits to the U.S.A.F., returning via Ottawa.

CRANWELL COMMANDANT VISITS U.S. AND CANADA

Air Commodore R. L. R. Atcherley, C.B.E., A.F.C., Commandant of the R.A.F. College, Cranwell, and Mr. Patrick Johnson, O.B.E., Director of Studies, recently visited the United States Military Academy, West Point, New York, and afterwards the R.C.A.F. Cadet College, Vancouver, to see at first hand American-Canadian methods of training at institutions comparable with the R.A.F. College.

ARMAMENT LIAISON VISIT TO CANADA

A liaison team, led by Air Commodore C. M. Heard, C.B.E., Director of Training (Weapons), from the Empire Air Armament School at Manby, recently visited Canada to demonstrate to the R.C.A.F. the latest armament devices and to exchange views on air weapons training. This was a follow-up of earlier liaison visits to India, the Far East, U.S.A., South Africa and Southern Rhodesia, Australia and New Zealand.

THE WORLD'S LARGEST LANDPLANE

The eight-engined Brabazon I, which was expected to make its maiden flight last November, is now externally and structurally complete, states the latest communication from the Society of British Aircraft Constructors, and this interesting flight can be expected early this year.

The structure weight of this 127-ton transoceanic airliner proved to be only 50 lb. more than the designer's estimate.

The operational requirement for which the aircraft is designed, the transport of 100 passengers non-stop between London and New York, necessitating carrying 13,500 gallons of fuel, means that weight control is of greater importance than for any other civil aircraft yet designed. The greater part of 150 miles of electrical cable has been installed. One of the biggest problems has been the designing, development and testing of a mechanical method of actuating the enormous control surfaces. Flight tests of the hydraulic system, fitted in a Lancaster bomber, have been very successful.

VAMPIRE'S OPERATIONAL RANGE

We note that a Vampire Jet Fighter, with normal tankage and R.A.F. equipment, recently flew non-stop from London to Rome (916 miles) in 2 hours 50 minutes.

The aircraft was flown at cruising speed (323 m.p.h.). Its range with 530 gallons is 1,145 miles. This is the fastest time for a flight between England and Rome. On a 6,000-mile flight from England to India, three Vampires covered the last 960 miles non-stop.

THE ROYAL OBSERVER CORPS

The Secretary of State for Air recently emphasized the necessity for a fully manned, fully efficient Royal Observer Corps for the Air Defence of Great Britain. The advance of science, including the latest development in radar, does not mean that the R.A.F. can dispense with their co-operation. One of the lessons learnt from the Battle of Britain exercise in 1948 was that the human eye, the human ear, and the human brain, allied together in the shape of the trained member of the Royal Observer Corps, can play a part in the detection and recognition of the fastest types of modern aircraft, *which cannot be accomplished by any other means.*

Although in the past year the membership increased from 9,000 to 13,000, a total force of 28,000 men and women is urgently needed.

GREAT BRITAIN'S NEWEST HELICOPTER

The two-seater Cierva "Skeeter," Great Britain's newest helicopter, has made successful test flights. It has been specially designed as a light-weight helicopter for the Services, for training and for private owners. If manufactured in reasonable quantities its price would be less than £3,000. The all-in running cost would be comparable with that of a 20 h.p. car. It has a disposable load of 400 lb, and has an estimated range of 270 miles with one occupant, 155 miles with two. A 102 h.p. Jameson flat-four engine provides the power.

THE IRON CURTAIN

A glimpse underneath the Iron Curtain of Russia would show us new developments in their ideas and increasing productive efforts. Their air force is no longer completely dominated by the army's needs and has a measure of independence as a tactical force. Numerous German scientists are supervising their technical developments and their commander-in-chief and his staff have made a close study of the British and American methods used during the war. They are busily building up a giant long-range bomber force, mostly their own version of the Superfortress supplemented by the Ilyushin four-jet bomber developed from the Heinkel 343.

The Berlin newspaper *Die Welt* reported recently that between forty and eighty jet heavy bombers were operating from a base in Germany for the Red Army's manœuvres.

The Russian Air Force is alleged to be more than 600,000 strong and to have at least 16,000 aircraft, and their potential output for 1949-50 is stated to exceed 10,000 aircraft.

NEWS FROM AMERICA

Ninety-four Convair B-36 six-motor bombers are on order for the U.S.A.F. The armament consists of sixteen 20-mm. cannon plus a McDonnell XF-85 "Parasite" fighter in the forward bomb bay. Maximum bomb load is 72,000 lb., whilst for short-range work it can be increased to about 85,000 lb. Maximum speed is 360 m.p.h. at 30,000 ft., and the all-up weight is 278,000 lb.

Recent tests have demonstrated that jet-assisted take-off rockets fitted to a Lockheed Constitution will provide the aircraft with extra power roughly equal to one of its 3,500 h.p. Pratt and Whitney engines. Six rockets were used, three fixed in compartments inside the wing on each side of the fuselage behind the inboard engines and above the flaps.

These rockets were fired by the pilot as soon as the aircraft was off the ground with its undercarriage retracting. Reaction from the firing lasted approximately 15 seconds and no buffeting was caused. Use of the 450 kilogramme (1,000 lb.) bottles shortened the aircraft's take-off run by about 24 per cent. The installation of rockets on large aircraft as part of normal equipment would, say Lockheed engineers, provide an extra measure of safety should there be a power failure during take-off.

UNITED STATES AIR FORCE

The U.S.A.F., just entering its second year of autonomy as one of the three co-equal members of the National Military Establishment, is divided into fourteen major commands, five of them overseas and nine in the United States.

The overseas commands are: Europe, Far East, Alaska, Caribbean and Pacific Air Commands.

During its first year of independence it grew to fifty-five operational combat groups. In 1948 the 8th Congress authorized a seventy-group Air Force, but due to the limitations of current appropriations, only sixty-six of these groups will be organized by June, 1949.

The primary functions of the Home Commands are:

Strategic Air Command. Controls very long-range bombardment, reconnaissance and fighter groups. Its mission: readiness to carry out intensive, sustained, long-range bombardment and fighter operations, alone or in co-operation with either land or sea forces, or both. S.A.C.'s principal weapons are the modified B-29, the B-36 and the B-50 giant bombers.

Tactical Air Command. Utilizes jet-propelled fighters, improved conventional fighters, and attack bombers for the performance of its mission of attacking enemy aircraft both in the air and on the ground and striking at hostile lines of communication and supply concentrations. The T.A.C. fighter forces are trained and equipped for independent operation anywhere in the world. Its functions also include photo reconnaissance and tactical troop-carrying.

Air Defence Command. Guards the United States against possible enemy air attack by maintaining fighter interceptors and night fighters, guided by co-ordinated aircraft warning and control systems, always ready for action. A.D.C. also supervises the training of Air Reserve and Air National Guard fighter and bombardment units, and the Air R.O.T.C.

Air Material Command. Responsible for the research and development which keeps the U.S.A.F. always equipped with the most modern air weapons and material. Operating the largest aeronautical research centre in the world, A.M.C. constantly probes new fields: jet propulsion, guided missiles, rockets, supersonic speed, electronics-radar, cosmic rays, atomic energy. It also develops and supplies new equipment for use by U.S.A.F. personnel under all operational conditions.

Air Training Command. Trains pilots, air crews and maintenance personnel from the start of basic training into all the highly specialized fields of an Air Force in which all personnel must be specialists. Unit training of the three major cambat commands is supervised by Air Training Command (except for advanced training given at the Air University). Virtually all Air Force technical and flying schools fall under control of the Training Command through one or the other of two subordinate headquarters, Technical Training Division and Flying Training Division. A third, the Indoctrination Division, is responsible for the basic training of all new airmen.

Air University. Co-ordinates a far-reaching educational programme designed to train and educate present and future Air Force personnel to make them the most efficient in the world. It supervises such U.S.A.F. institutions as the Air War College, Air Command and Staff School, Air Tactical School, Special Staff School, and the School of Aviation Medicine. It is in charge of nearly all advanced U.S.A.F. courses, both in service schools and at civilian universities, and crystallizes and passes on to field installations the latest Air Force doctrines.

Military Air Transport Service. Provides non-tactical air transportation of military personnel and freight in support of the Air Force, Navy, and Army, as well as air evacuation of the sick and wounded to and within the United States. M.A.T.S. also commands and administers its numerous overseas bases and four operating services in the United States: Air Rescue Service, Air Weather Service, Flight Service, and Airways and Air Communications Service.

Air Proving Ground. A tactical testing laboratory to review, test and evaluate Air Force equipment and thus to help develop U.S.A.F. tactical doctrines, battle techniques and training procedures.

Headquarters Command. The "housekeeping" unit of U.S. Air Force Headquarters, it handles the administration of personnel assigned to Air Force Headquarters, provides and maintains aircraft for the proficiency flying required of these personnel, and furnishes a special air mission unit for transportation of high-ranking military, governmental and diplomatic officials on duty flights throughout the United States.

U.S.A.F. GREW BY 89,000 DURING FIRST YEAR OF AUTONOMY

Since its last birthday the United States Air Force has grown from a total strength of 311,000 officers and enlisted men and women to more than 400,000, approximately 130,000 of whom are stationed overseas.

During the past year, Congress raised the U.S.A.F.'s strength ceiling from 401,000 to 502,000, and authorized the Air Force to accept up to 15,000 18-year-old volunteers for one-year terms of enlistment.

Early in this year the U.S. Air Force was forced to institute a temporary restriction of enlistments in order to regulate the intake of thousands of new recruits who were applying for duty with the U.S.A.F.

[What a different picture this presents to our own recruiting results.—EDITOR.]

AVIATION, 1903

In view of the interesting article in this number entitled "Aviation History, 1903 to 1960," by John K. Northrop, we think readers might be interested in the following extract from the diary of Orville Wright.

"*December* 17*th*, 1903. When we got up a wind of between 20 and 25 miles was blowing from the north. We got the machine out early and put out the signal for the man at the station. Before we were quite ready, John T. Daniels, W. S. Dough, A. D. Etheridge, W. C. Brinkley of Manteo, and Johnny Moore of Nags Head arrived. After running the engine and propellers a few minutes to get them in working order, I got the machine at 10.35 for the first trial. The wind according to our annemometers at this time was blowing a little over 20 miles (corrected) 27 miles according to the Government annemometer at Kitty Hawk. On stopping the rope the machine started off increasing speed to probably 7 or 8 miles. The machine lifted from the track just as it was entering the fourth mile. Mr. Daniels took a picture just as it left the tracks. I found the control of the front rudder quite difficult on account of its being balanced too near the center and thus had a tendency to turn itself when started so that the rudder was turned too far on one side and then too . . ."

BERLIN AIR LIFT, 1948

In contrast to the above we are able to record that R.A.F. aircraft employed on the Berlin Air Lift have now flown considerably more than ten million miles since Operation "Plainfare" started on 28th June, 1948. They had carried by the end of November 132,000 tons of freight into Berlin. On return flights from Berlin the R.A.F. carried 24,274 passengers, about 3,500 tons of freight and 20,500 lb. of mail.

The opening of the new airfield at Celle, near Hanover, in the British zone, now being used by U.S.A.F. Skymasters, will assist considerably towards breaking the Russian blockade of Berlin.

OPERATION "SUNRISE"

The combined sea and air exercise in December of 1948 should have convinced those who doubted our continuous assertions that the efficiency of the R.A.F. is a matter requiring the immediate attention of the Government.

On the conclusion of the exercise the Press gave considerable prominence to the R.A.F.'s lack of skilled man power and its inability to operate, even for an exercise of this kind, an adequate number of aircraft. An equally dangerous weakness was its shortage of skilled men and women to man radar stations, operation rooms and other units of the ground organization.

At the time of the exercise Air Marshal Sir Hugh Saunders, Air Council Member for Personnel, revealed that only 1,000 volunteers of the 20,000 needed to man Royal Auxiliary Air Force fighter control units had been obtained. Other R.A.F. man power deficiencies are equally serious.

We have tried to deal adequately with this serious state of affairs in our Editorial. Speaking at Bath on 9th December, 1948, Air Marshal Sir Hugh Saunders said:

"Britain's frontier is her Radar Chain. Without it and without Fighter Control backed by the Royal Observer Corps we cannot give the early warning which the fighters and guns must have, or direct them to the attack; nor should we have proper means of detecting mine-laying aircraft or surface vessels trying to sneak into our seaways and estuaries under cover of darkness, or denying us the Western Approaches upon which depend our life-lines to America and Canada . . .

"We need particularly those with experience of this sort of work in the last war. They will recollect how interesting and exciting that work can be—how the invader showed up on the radar screen and how the plots moved on the table; how the information went out to the fighters and guns, and the warning to the A.R.P.; how the fighters went up and the dots representing fighters on the screen were brought nearer and nearer to the enemy, until the pilot's 'Tally Ho!' was heard over the radio and Control knew that he had swooped to the kill. They will remember distinguishing our own aircraft in the danger zone, and laying off the guns; and bringing home the 'lame duck' when all the others had come back. They will remember the comradeship and trust between all ranks which comes of being colleagues in a first-class team doing a worthwhile job.

"Along with them we need the youngsters to whom all this is a mystery, but a fascinating mystery; to whom it will give the opportunity of doing a real 'man's job' in the hour of need."

[There is much that service personnel could do in this "hour of need." If every reader of the QUARTERLY secured only one recruit for this urgently needed service, our present intake would be more than doubled.—EDITOR.]

THE LORD ESHER TROPHY COMPETITION REVIVED

The annual competition for the Lord Esher Trophy for Royal Auxiliary Air Force squadrons, which was suspended in 1939, has been revived. The trophy will be presented annually to the most efficient flying squadron judged by operational standards for war.

All aspects of squadron efficiency are embraced in the revised competition rules, marks being awarded for pilot efficiency, maintenance efficiency (as reflected in flying hours), recruiting, attendance at annual camp, and discipline.

The Air Officer Commanding-in-Chief, Reserve Command, will personally award the marks for discipline at his annual inspection, and will also award some of the marks for pilot efficiency when he sees the fly-past on the same occasion, special notice being taken of take-off and landing as well as of the actual fly-past.

Presented over twenty years ago by the late Viscount Esher, G.C.B., G.C.V.O., a great worker for the Territorial Army and Auxiliary Air Force, the trophy is a bronze figure (by Alfred Gilbert) of Perseus, standing on gilt bronze columns mounted on a bronze platform and base. It was last awarded in 1938, when it was won by 603 (City of Edinburgh) Squadron.

In 1926, the first year of the competition, and again in 1928, the trophy was won by No. 601 (County of London) Squadron. No. 605 (County of Warwick) Squadron were the second holders of the trophy, which they won in 1927 and again in 1930, 1931, 1933, 1934 and 1935. No. 602 (City of Glasgow) Squadron won it in 1929 and No. 604 (County of Middlesex) Squadron were the winners in 1932, 1936 and 1937.

GORDON SHEPHARD MEMORIAL PRIZE REINTRODUCED

The Gordon Shephard Memorial Prize essay competition, suspended in 1939, is being reintroduced. The competition is for the best essay on a flying subject set annually by the Air Ministry, submitted by a serving member of the Air Force. Members of the W.A.A.F. may compete.

Essays will be judged by three referees chosen by the Air Council. Prizes are: First, £50; second, £35, and third £20.

The subject for the 1948-49 competition is as follows:

"The increased speed and ceiling of modern aircraft and the introduction of new weapons and methods of defence are factors likely to affect all operations of an Air Force in any future war. Examine these factors and consider how they are likely to affect the operational employment of the R.A.F."

Prizewinners between 1919 and 1938 include many officers who later reached air rank, including Marshal of the Royal Air Force Lord Douglas of Kirtleside, Air Chief Marshal Sir John Slessor, and Air Marshals Sir George Pirie and Sir Ralph Sorley. The only individual to win a prize both as an N.C.O. and as an officer is Wing Commander F. Gomersall, now serving at the Air Ministry. He won third prize in 1936 as a Sergeant Pilot and second prize two years later as a Pilot Officer.

The prizes are provided from the income on a sum of money placed at the disposal of the Air Council for this purpose after the 1914-18 War by the late Sir Horatio Hale Shephard, in memory of his son, the late Brigadier-General G. S. Shephard, D.S.O., M.C.

(A.M.O. A837/1948 gives further details.)

L. G. GROVES MEMORIAL PRIZES AND AWARD

The L. G. Groves Memorial Prizes and Award, granted annually from a sum of money placed at the disposal of the Air Ministry in 1946 by Major Keith Groves, J.P., and Mrs. Groves, of Manghold, Isle of Man, in memory of their son, Sergeant Louis Grimble Groves, R.A.F.V.R., a meteorological observer who lost his life on a weather flight in September, 1945, have been awarded this year as follows:

The L. G. Groves Memorial Prize for Aircraft Safety: Wing Commander T. Q. Horner, for improvements effected in R.A.F. rescue facilities.

The L. G. Groves Memorial Prize for Meteorology: Dr. Ronald Frith, Principal Scientific Officer, Royal Aeronautical Establishment, Farnborough, for valuable services with the Meteorological Research Flight.

The L. G. Groves Memorial Award for Meteorological Air Observers: Flight Sergeant P. G. White, R.A.F.V.R., for meritorious work and devotion to duty.

The objects of the prizes and award are to encourage the study of problems concerning the safety of aircraft and flying personnel; to stimulate meteorological research and its application to aviation; and to recognize meritorious work by meteorological air observers.

HISTORY OF THE DESERT AIR FORCE

We publish the undermentioned notice at the request of the Hon. Secretary, R.A.F. Benevolent Fund:

"In view of the fact that many of the officers and men of Desert Air Force who in 1945 subscribed for copies of a history of Desert Air Force to be compiled by Flying Officer Roderic Owen have by now undoubtedly changed their addresses, original subscribers are asked to claim their copies in writing from the R.A.F. Benevolent Fund, 1, Sloane Street, London, S.W.1."

BATTLE OF BRITAIN MEMORIAL

We have been asked by the Hon. Secretary of the Battle of Britain Memorial, E. H. Keeling, Esq., M.C., M.P., to bring the undermentioned information to the attention of our readers:

"All ranks of the R.A.F. are reminded that when in uniform they may visit the Royal Air Force Chapel in Westminster Abbey, with its Battle of Britain window, free of charge.

"A book about the history of the Chapel, with sixteen full-page illustrations and a coloured plate of the window, is now on sale, price 2s. 6d., at the Abbey or by post from Skinner & Co., 124, Denmark Hill, S.E.5."

THE R.A.F. COLLEGE

The present-day cadets will have to maintain a very high standard if they are to follow in the footsteps of their new commandant, Air Commodore George Beamish. . . .

Winner of the Sword of Honour as best cadet of the senior term twenty-four years ago, he has since captained Ireland and been capped no less than twenty-five times for Rugby. He represented Cranwell College at Rugby, soccer, hockey, cricket, golf and boxing.

Air Commodore Beamish has played a grand game for the Royal Air Force in peace and war by fostering that "team spirit," on the ground and in the air, for which the Air Force has built up a great tradition.

Cranwell cadets, the torch is being passed on to you; carry it forward to even greater achievements.

Book Reviews

MILITARY AND POLITICAL CONSEQUENCES OF ATOMIC ENERGY, by Professor P. M. S. Blackett. (Turnstile Press Ltd.; 12s. 6d.)

Since the first shock of Hiroshima and Nagasaki broke upon the consciousness and, to an extent, the conscience of the civilized world, much contemporary thought has inevitably been focused upon the atomic weapon as an instrument of national policy and its influence on the art and conduct of war.

Of its power of devastation, the face of the two Japanese cities provides irrefutable and tragic witness, but on the wider issue, as to whether such mass destruction can, in itself, prove decisive in war, opinion appears divided. This contentious subject, which is bound up with the whole conception of air power, is, in fact, not new, but has necessarily been brought into sharper relief by the events in Japan and at Bikini Atoll.

Professor Blackett, addressing himself to this problem, has undertaken the difficult task of assessing the effect of atomic energy in future wars and of weighing the political consequences of its development. He explains, in his introduction, that in attacking this question it was necessary, in view of the limited use of the atomic weapon at the end of hostilities, to consider the war as a whole in relation to normal bombing. Much of the first part of the book is, therefore, devoted to a detailed study of the history of the bombing offensives and of the part they played in securing the final defeat of the Axis Powers.

The deduction which, he says, "must inevitably be drawn from this analysis is that any future war in which America and Russia are the chief contestants would certainly not be decided by atomic bombing alone. On the contrary, a long-drawn-out bitter struggle, over much of Europe and Asia, involving million-strong land armies, vast military casualties and widespread civil war would be inevitable."

Without entering into the realms of controversy on this prediction, it is, nevertheless, pertinent to examine the foundations upon which this structure of deduction is built. Reviewing Chapters II and III, in which Professor Blackett conducts his fundamental analysis, one cannot but be impressed by the fact that the numerous documentary sources cited and so freely quoted tend to support a preconceived view rather than an objective judgment, and the reader may indeed be left with some doubt whether sufficient "concrete" has gone into the materials used for the foundations to support so weighty an edifice.

Although emphasis is given to the completeness of the documentary evidence available from which "to assess with considerable accuracy the part which long-range bombing played in the final defeat of Germany and Japan," it is also freely admitted that "the study is far slighter than could be desired . . . and that the writer could legitimately make the claim of the witness in the opening passage of a well-known detective story: 'He told the truth and nothing but the truth, but not of course the whole truth, if only because there was not time.' "

With this last observation many, conscious of the vital omissions—notably the decisive influence of those ceaseless battles over the Rhine, Ruhr and Berlin on the subsequent re-entry into North-West Europe and the colossal strength that Hitler was compelled to divert to the defence of the Reich, even at the expense of the U-boat Campaign, will most assuredly agree and will have difficulty in finding valid support for the bold assertion that "area bombing did little to help win the war."

It is upon such premises that Professor Blackett proceeds to discuss, at some length, the strategic consequence of the atomic bomb and its political implications. He also reviews the steps that have been taken, over the past three years, towards the establishment of control of atomic energy and, from his reading of the lessons of the last war, seeks to prove that the development of atomic power for industrial purposes is infinitely the most important, expressly for Russia, and that the plans for the control of atomic energy recommended by the majority of the United Nations Atomic Energy Committee are illogical and unrealistic. This part of the book is, therefore, largely political in character and will, undoubtedly, be acclaimed by those in sympathy with the aims of the Soviet Union.

THE ARMY AIR FORCES IN WORLD WAR II. Vol. I. Prepared, under the editorship of W. F. Craven and J. L. Cate, by the Air Historical Office, U.S.A.F. (Chicago University Press. $5.)

The publication of the first volume of the official history of the United States Air Forces, so soon after the end of the war, is a great achievement and one which will be applauded by students of air power in all parts of the English-speaking world.

The production of an historical work of this nature, demanding an unchallengeable degree of accuracy and judgment, requires arduous research into a complexity and mass of documentary sources and, if undertaken by a single historian, is inevitably a very lengthy and often tedious process.

Faced with this problem, the Air Historical Office at Washington has adopted the expedient of employing a number of historians, each with the duty of writing a separate monograph, and then integrating the series, by vigorous editing, into a comprehensive work.

The style, which is factual and clean cut, is thus, in the result, uniform and the manner in which this has been achieved in the present volume reflects the greatest credit on the editors concerned. The obvious weakness of this method is that it tends towards the segregation of certain aspects, rather to the detriment of the close inter-relationship between policy and action so vital to a clear conception of air warfare.

The Americans have, however, escaped the error of sacrificing quality to speed of production and the present monumental work of more than 800 pages conforms to a high standard of objectiveness and historical truth. It has been written wholly without national or Service bias and the authors have, throughout the text, been at pains to pay generous tribute to the help and guidance provided by the Royal Air Force on technical matters and organizational and operational questions in the build-up of their Air Forces in Europe.

The volume has been arranged in four parts entitled, respectively, "The Early Heritage," "Prelude to War," "Tactical Demands" and "Preparations for the Air War Against Germany." The reader is thus taken from the initial development and action of the Air Arm in the 1914-18 War, through the intervening years of peace to the onset of the American participation in World War II. The greater part of the book is, in fact, devoted to the 1939-42 period and includes such subjects as the Air Defence of the Western Hemisphere, the Early Development of Transport and Ferrying, Pearl Harbour and the Loss of the Netherlands East Indies, and the role of the American Air Forces in the Battle of the Atlantic. Finally, there is a large and important section given over to the planning, policy and organization associated with the establishment of the 8th Air Force in the United Kingdom. In the course of these chapters the reader is made aware of the many difficulties associated with the growth of the American Air Arm over the past quarter of a century and the action which was taken to bring the force to a state of readiness for war in the critical period of 1941-42.

The whole volume is beautifully produced, even by American standards, and is well illustrated by maps and photographs—although the latter have been used sparingly and chosen with the utmost care in relation to the text.

It is a book that will, undoubtedly, be very widely read and consulted both within the Service and by the general public.

ARTICLES OF INTEREST IN PERIODICALS

ECONOMIST (October, 1948).

"Europe and the World's Oil."

MILITARY AFFAIRS, U.S.A. (Fall, 1948).

"Hitler's Plans for Invading Britain."
"Writing Contemporary Military History."

INTERNATIONAL AFFAIRS (October, 1948).

"Atomic Energy Control: The Present Position."
"Japan's Fatal Blunder."
"The Study of History in the Light of Current Developments."

AIR UNIVERSITY QUARTERLY REVIEW, U.S.A.F. (Fall, 1948).

"Operational Concepts for Modern War."
"Air Power and Foreign Policy."
"Air Power and Principles of War."
"The Strategic Striking Force."

NEW BOOKS

AIR AFFAIRS

"Report of the Chief of Staff, U.S.A.F., to the Secretary of the Air Force." By General Carl Spaatz (U.S. Government Printing Office, Washington).

"The Air Officers' Guide: A Ready-Reference Encyclopedia of all Military Information Pertinent to Commissioned Officers of the U.S.A.F." (Military Service Publishing Co., Harrisburg, Pa., U.S.A.)

BIOGRAPHY.

"The Memoirs of Cordell Hull." (Hodder & Stoughton.)

MILITARY.

"Psychological Warfare." By Paul Linebarger, M.A. (Infantry Journal Press, Washington).

POLITICAL.

"The Price of Power." By Hanson W. Baldwin. Discusses the Military Position of America in the post-war world. (Harper, New York.)

"The West at Bay." By Barbara Ward. An attempt "to give some background to the related topics of the Marshall Plan and of Western Union," with a short chapter on Western Defence. (Allen & Unwin.)

NAVAL.

"The Bismarck Episode." By Capt. Russell Grenfell, R.N. (Faber.)

TRAINING.

"Audiovisual Aids to Instruction." By. Capt. W. Exton, U.S.N.R. (McGraw Hill, New York.)

Printed and Published in Great Britain by GALE & POLDEN LTD., Wellington Press, Aldershot. Overseas Agents, INDIA: THACKER, SPINK & CO., Calcutta and Simla. THACKER & CO, LTD., Bombay. HIGGINBOTHAMS, LTD., Madras and Bangalore. CANADA: WM. DAWSON SUBSCRIPTION SERVICE, LTD., 70, King Street East, Toronto, 2 Canada. AUSTRALIA and NEW ZEALAND: ANGUS & ROBERTSON, LTD. SOUTH AFRICA: W. DAWSON AND SON (S.A.) LTD., 29 and 31, Long Street, Capetown.

HAWKES & CO., LTD.

Civil and Military Tailors and Outfitters to Officers of the Royal Air Force

1, SAVILE ROW
LONDON, W.1
TELEPHONE: REGENT 0186

68, HIGH STREET
CAMBERLEY
TELEPHONE: CAMBERLEY 829

Uniforms and Mufti
Made to Measure

Lounge Suits, Overcoats, Hacking Jackets, Blazers,
Shirts, Shoes, etc., in stock for Immediate Wear.

We have a ladies' department at both addresses.

TELEPHONE: AVENUE 3907

Dombey & Son

ESTABLISHED 1869

99 LEADENHALL STREET
. . LONDON, E.C.3 . .

R.A.F. BLAZERS MADE TO MEASURE

R.A.F. Badges and R.A.F. Squadron Badges Supplied

BPA

BOULTON PAUL
AIRCRAFT LTD.

Designers
&
Constructors
of
Aircraft
&
Armament

WOLVERHAMPTON
ENGLAND

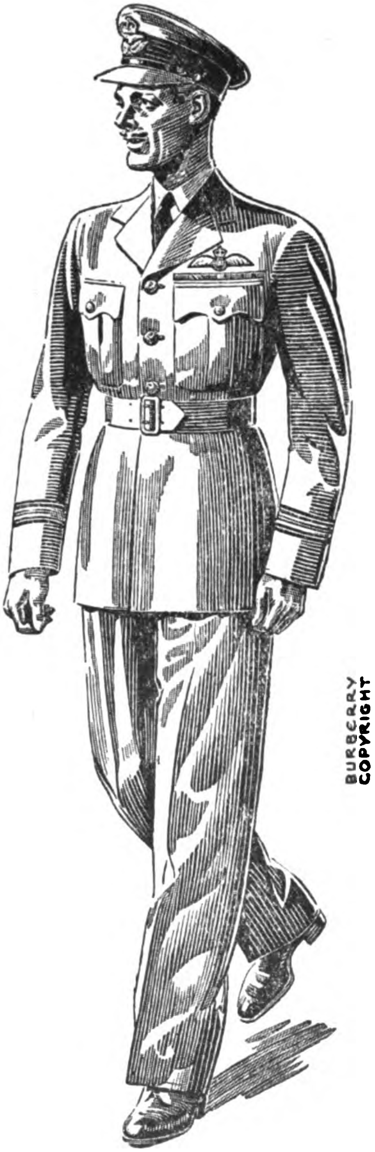
LIBRARY
MAY 25 1949
UNIVERSITY OF CALIFORNIA

THE ROYAL AIR FORCE QUARTERLY

AND

EMPIRE AIR FORCES JOURNAL

Vol. 20 No. 2 Price 6/- (NET) April, 1949



"NULLI

SECUNDUS"

Burberrys carry a tradition for quality and perfection of Officers' Uniforms and Equipment for the R.A.F.,—"Second to None."

Though Uniforms must conform to regulation pattern, yet Burberry cut and perfection in materials give a smartness that is instantly recognised.

Burberry Service Waterproofs made of the famous Burberry Gabardine give a sense of weather security allied to durability under the most exacting climatic conditions.

BURBERRYS

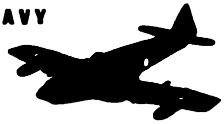
Haymarket - London S.W.1

***Telephone :* *WHITEHALL* 3343**

BURBERRYS LTD.

ANOTHER
NAVY CHOOSES
THE FAIREY FIREFLY

ROYAL CANADIAN
NAVY



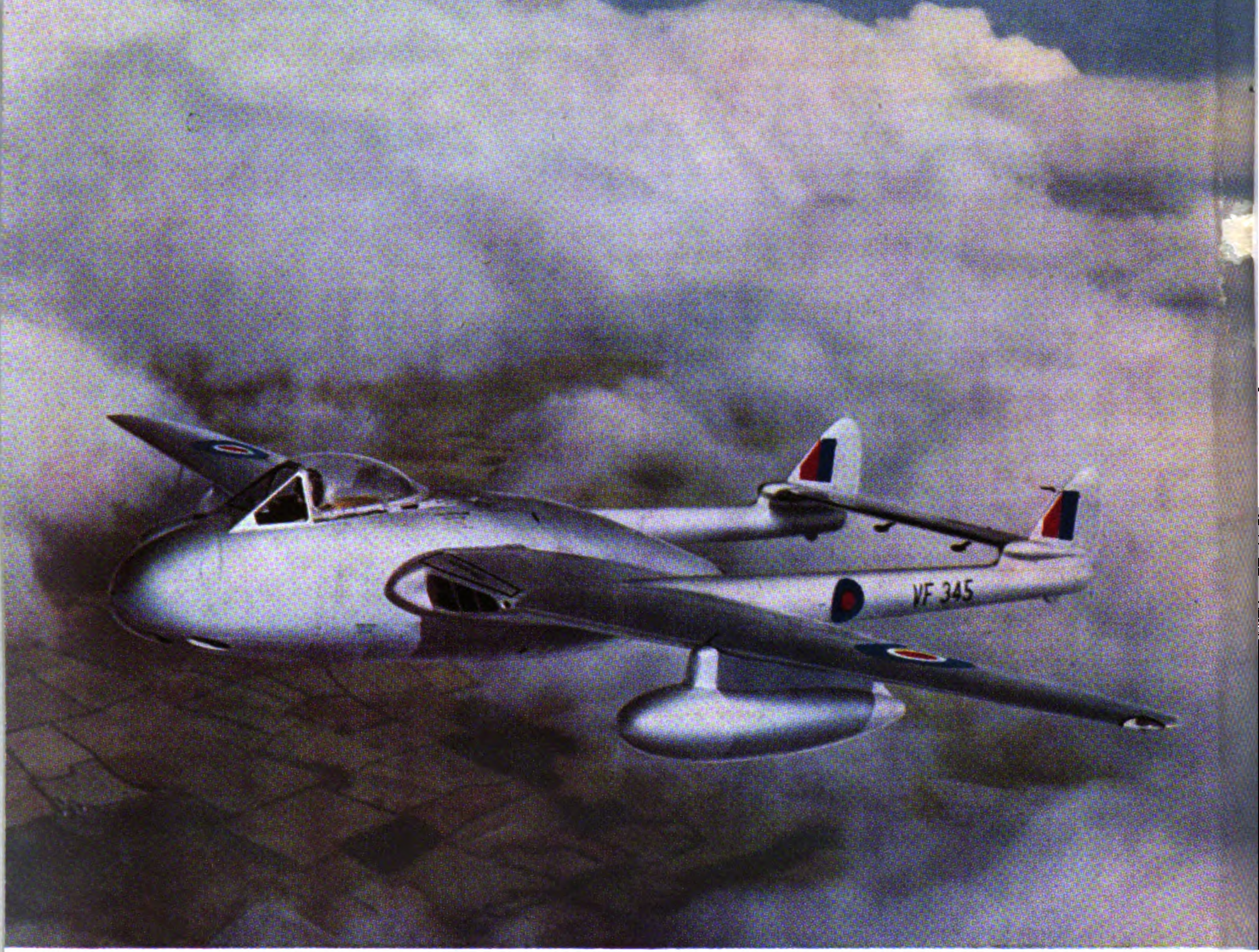
ROYAL AUSTRALIAN
NAVY

ROYAL NETHERLANDS
NAVY

ROYAL NAVY

The Royal Australian Navy has ordered the Fairey Firefly Fleet Reconnaissance Fighter. Thus FOUR of the world's Navies now have this famous aircraft—
R.N.—R.A.N.—R.C.N.—R.N.N.

FAIREY
THE FAIREY AVIATION CO. LTD.
HAYES, MIDDLESEX



VAMPIRE

Steadily developing —

the fighter of the future

DE HAVILLAND

DH AIRCRAFT

DH ENGINES

Table Lighter, S49/1, £3/18/6 Pewter Tankard, S49/2, £1/10/0 Pocket Lighter (Silver Plated), S/49/3, £2/15/0
Pewter Ash Tray, S49/4, 19/6 Gilt Compact 2¼" (Silver Wings), S49/5, £3/3/0

BY APPT. TO
LATE KING GEORGE V

SKINNER & CO.
(S/LDR. A. E. L. SKINNER, M.C.)
Aviation Jewellers and Silversmiths

BY APPT. TO
H.M. QUEEN MARY

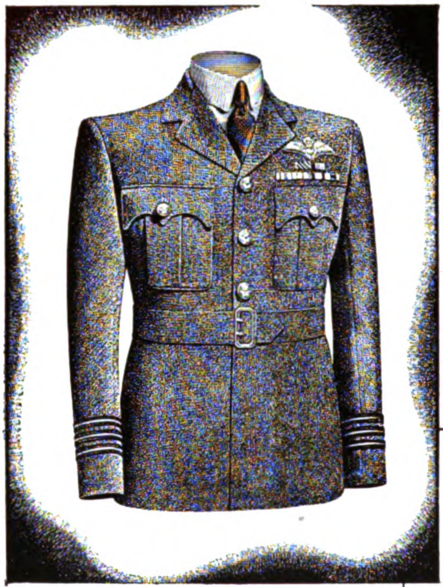
Specialise in

R.A.F. CRESTED GIFTS · SQUADRON CREST BROOCHES TO ORDER · ENGAGEMENT RINGS · PRESENTATION SILVER

MONDAY
FRIDAY
9-5
SATS. 9-12

35 OLD BOND STREET,
(2nd Floor)
LONDON, W.1

TELEPHONE
REGENT
5115



By Appointment
Naval Outfitters to H.M. The King
Established 1785

Gieves
LIMITED

Outfitters to :

ROYAL AIR FORCE and DOMINION AIR FORCES

27, OLD BOND STREET, LONDON, W.1

Telephone : REGent 2276 *Telegrams : Muftis, Piccy, London*

BRANCHES

EDINBURGH PORTSMOUTH CHATHAM PLYMOUTH
LIVERPOOL SOUTHAMPTON WEYMOUTH BATH
BOURNEMOUTH LONDONDERRY MALTA GIBRALTAR

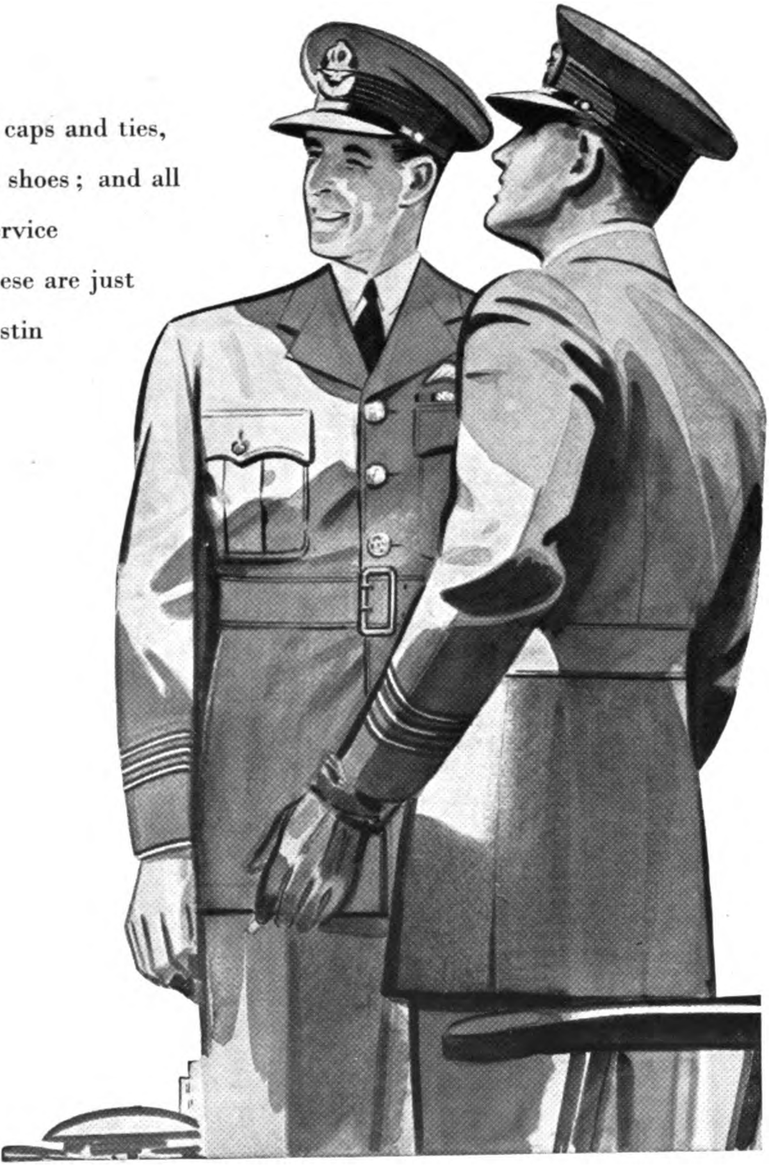
PROGRESS

One of Britain's biggest jet engines, the Rolls-Royce "Nene," has passed some very stiff tests in America, where the engine is being manufactured under licence. The American technical papers describe the "Nene" as being a remarkable engine, and speak of it as a possible motor for future American airliners. It is reported that the tests were satisfactory beyond all expectations and that over 600 of these British motors are now to be built in the United States for the latest Navy fighters.

ROLLS-ROYCE
Aero
ENGINES
FOR SPEED AND RELIABILITY

ROLLS-ROYCE LTD., DERBY London Office : Conduit St., W.1

Good uniforms; caps and ties, shirts, socks and shoes; and all other items of service equipment — these are just a part of the Austin Reed service.



AUSTIN REED

OF REGENT STREET

LONDON AND PRINCIPAL CITIES · LONDON TELEPHONE: REGENT 6789

DUNLOP
fully approved by A.R.B. for use on civil aircraft

It is a requirement of the Air Registration Board that all Hose Assemblies forward of the fireproof bulkhead are flameproof. Dunlop Flameproof Assemblies have received official A.R.B. approval for use on civil aircraft. They provide an exceptionally high factor of safety and are available in a wide range of sizes. Follow the lead of the majority of aircraft manufacturers and specify Dunlop.

DUNLOP
flameproof
HOSE ASSEMBLY

DUNLOP RUBBER CO. LTD., *Aviation Division*, COVENTRY

9H/901

READY - TO - WEAR UNIFORMS

Complete with rank and ribbons in a few hours

TAILORS TO THE SERVICES FOR OVER 60 YEARS

MOSS BROS
OF COVENT GARDEN
THE COMPLETE MAN'S STORE

Junction of
Garrick & Bedford Streets, W.C.2.
Temple Bar 4477

AND BRANCHES

ST. PETER'S COURT

First-Class Preparatory School for Boys

Age Six to Thirteen and a Half

The fees are reasonable, and bursaries are available to help sons of serving and retired R.A.F. Officers

BURGESS HILL
SUSSEX

A limited number of New Accounts can now be considered. We are the Firm which specialises in service to Officers' Messes of His Majesty's Navy, Army and Air Force

The Firm which has established a direct link between the Wine Growers and Hundreds of Officers' Messes throughout the Country

BOSTOCK & KIMPTON LIMITED

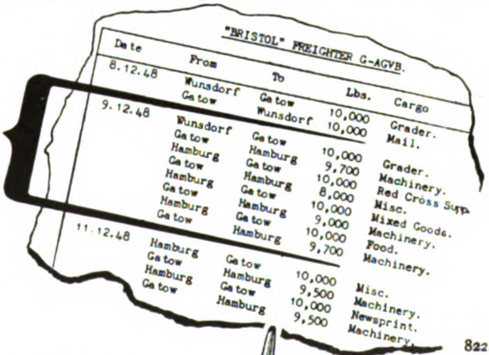
56 HAYMARKET LONDON, S.W.1 *Cellars—14 Seething Lane, E.C.3*

Telephone: ABBey 1441/2 **WINE MERCHANTS** *Telegrams: Boskimtock, Lesquare, London*

"BRISTOL" FREIGHTERS ON THE BERLIN AIR-LIFT

34 Tons in One Day

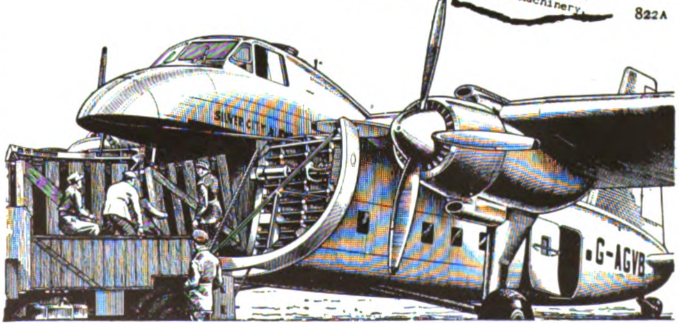
Conspicuous among many exceptional freighting operations carried out by "Bristol" Freighters on the Berlin Air-Lift is the impressive record of one day's work by G-AGVB. During eight to and fro journeys, this aircraft carried a total of 76,400 lbs. of mixed cargoes . . . a fine performance by a twin-engined aircraft.



"BRISTOL" FREIGHTER G-AGVB.

Date	From	To	Lbs.	Cargo
8.12.48	Wunsdorf	Gatow	10,000	Grader.
	Gatow	Wunsdorf	10,000	Mail.
9.12.48	Wunsdorf	Gatow	10,000	Grader.
	Gatow	Hamburg	9,700	Machinery.
	Hamburg	Gatow	10,000	Red Cross Supp.
	Gatow	Hamburg	8,000	Misc.
	Hamburg	Gatow	10,000	Mixed Goods.
	Gatow	Hamburg	9,000	Machinery.
	Hamburg	Gatow	10,000	Food.
	Gatow	Hamburg	9,700	Machinery.
11.12.48	Hamburg	Gatow	10,000	Misc.
	Gatow	Hamburg	9,500	Machinery.
	Hamburg	Gatow	10,000	Newsprint.
	Gatow	Hamburg	9,500	Machinery.

822A



THE BRISTOL AEROPLANE COMPANY LIMITED · ENGLAND

REG. MARK

SACCONE & SPEED LTD
(INCORPORATING HANKEY, BANNISTER & CO.)

ESTABLISHED
IN THE YEAR
1839

• •

FINE
WINES - SPIRITS
CIGARS - CIGARETTES
TOBACCO

• •

32 SACKVILLE STREET
PICCADILLY, LONDON, W.1
BRANCHES AND CORRESPONDENTS
THROUGHOUT THE WORLD

BY APPOINTMENT
HATTERS
TO H.M. THE KING

FROM ALL ANGLES

ALWAYS ON THE BEAM

The H.J. Cap is becoming increasingly popular because it is light in weight and has the comfortable 'feel' of an old friend from the first time of wearing.

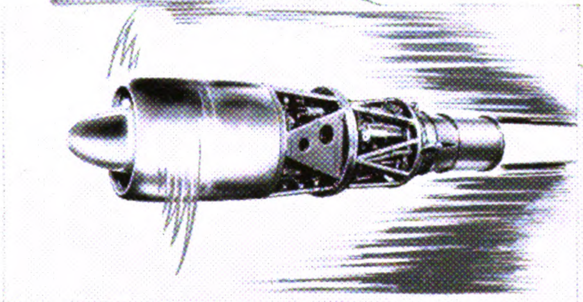
THE H.J. SPECIAL FOR THE R.A.F.

HERBERT JOHNSON
(BOND ST. LTD.)

Military and Civilian Hatters

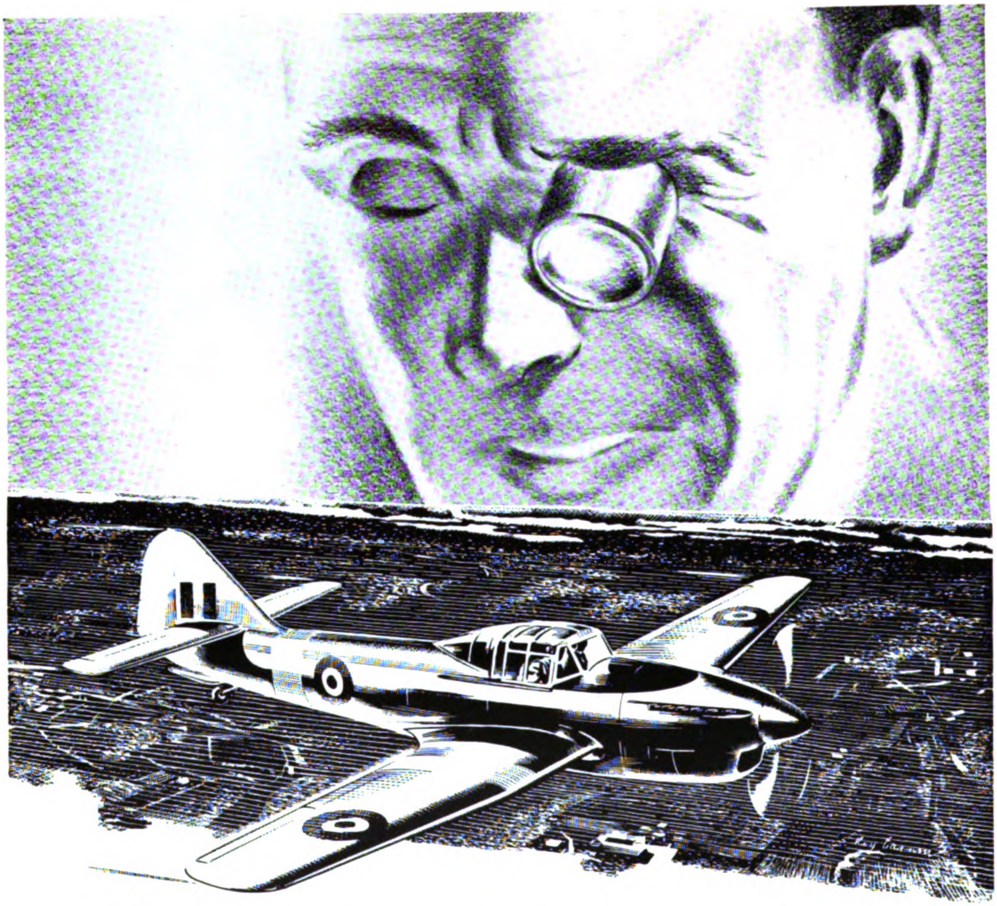
38 NEW BOND STREET, W.1 MAYfair 0784

NAPIER
GAS TURBINE
AERO ENGINES



'NAIAD'
propeller turbine

D·NAPIER & SON LTD. LONDON W·3



Can instinct be detected?

Modern theory can account for instinct—yet closest examination will not predict it. Only a study of the heredity involved can do that. Here in the Athena is an advanced trainer whose characteristics are the product of a long "heredity" of applied experience in trainers—an aeroplane sympathetic to the pupil yet always firm. All Avro's trainer "know-how" is built into the new Athena.

THE AVRO **ATHENA** ADVANCED TRAINER

MK II. ROLLS ROYCE MERLIN 35 ENGINE

A V ROE & CO LTD MANCHESTER (BRANCH OF THE HAWKER SIDDELEY GROUP)

AVRO

★ *On Duty-Off Duty*

NAAFI

Serves the Royal Air Force

No one but you owns Naafi . . . No one but you, the Service man or woman, benefits from Naafi facilities or Naafi profits!
Naafi is the means by which the Forces buy wholesale, to sell to the Forces retail, retaining for the Forces all surpluses! Help yourself by patronizing Naafi.

The Official Canteen Organization for H.M. Forces

RUXLEY TOWERS · CLAYGATE · ESHER · SURREY

Without departing from proven aerodynamic and aeronautical engineering practice, the designers of the Ambassador have, by careful attention to detail, produced an aircraft which is outstanding in all-round performance

AMBASSADOR

AIRSPEED LIMITED · CHRISTCHURCH AND PORTSMOUTH

IN ASSOCIATION WITH THE DE HAVILLAND ENTERPRISE

THE ROYAL AIR FORCE QUARTERLY
AND
EMPIRE AIR FORCES JOURNAL

EDITOR:
GROUP CAPTAIN A. H. STRADLING, O.B.E., R.A.F. (RET.)
Assisted by an Advisory Committee of Members
of the R.A.F. and Air Forces of the Dominions

VOLUME XX APRIL, 1949 NUMBER 2

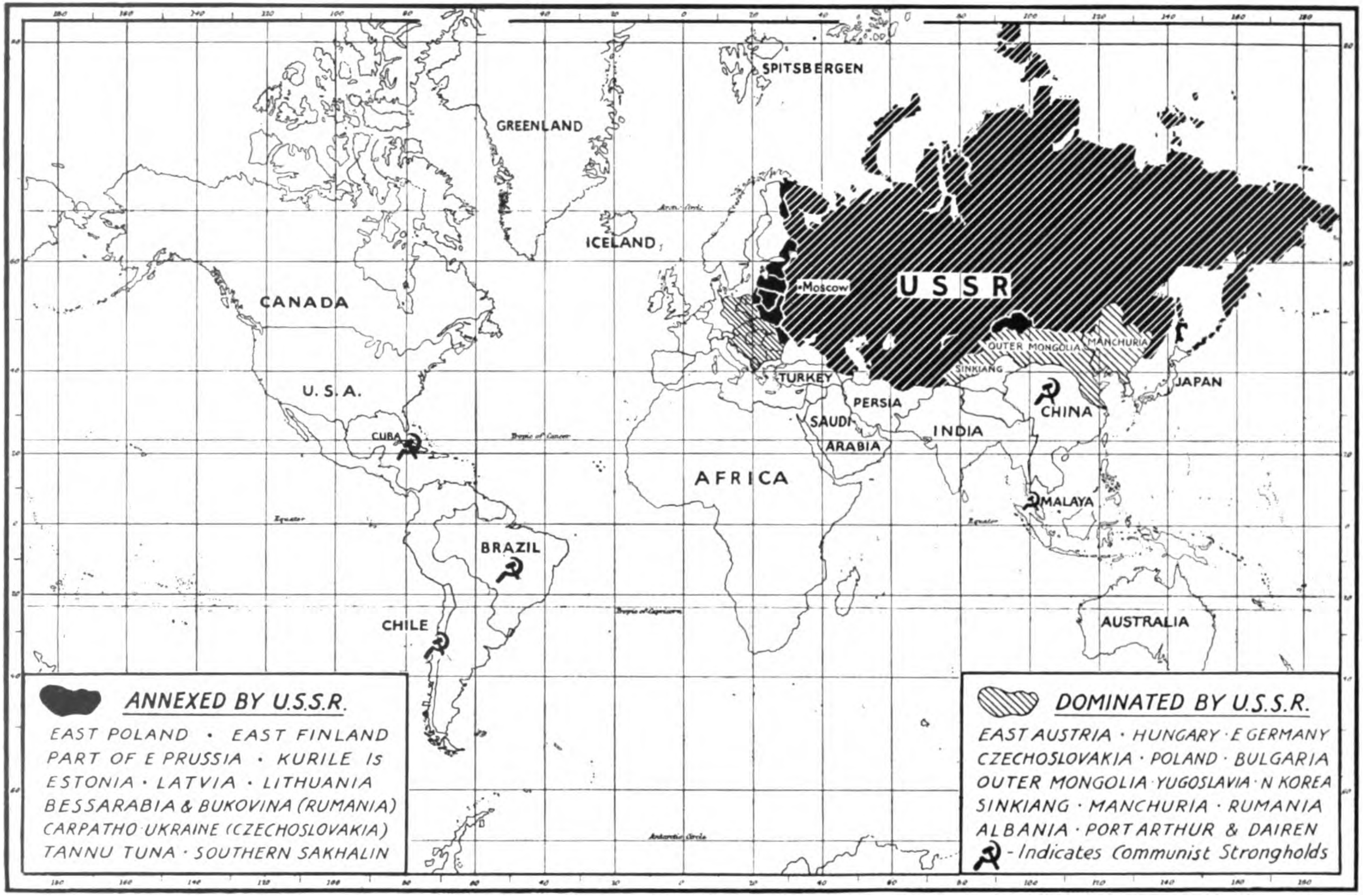
The views expressed in articles in this JOURNAL *are those of the authors, and are not to be construed as official opinions or policies.*—EDITOR.

CONTENTS

PAGE
EDITORIAL 65
MARSHAL OF THE ROYAL AIR FORCE THE LORD TEDDER, G.C.B., D.C.L., LL.D. A BIOGRAPHY. *By A. H. Narracott* .. 71
HIGH-SPEED INTERCEPTION. *By Squadron Leader H. R. Allen, D.F.C.* 73
THE INFLUENCE OF MODERN TECHNIQUES OF WAR ON STRATEGY. *By "Aquila"* .. 79
THE R.A.F. TASK FORCE, MALAYA .. 86
PRIZE ESSAY. *By Squadron Leader J. M. S. Ross, R.N.Z.A.F.* 89
THE JOINT SERVICES COLLEGE 91
ATLANTIS AND BOGATA. *By J. M. Spaight, C.B., C.B.E.* 93
A TESTING TIME—AND A TIME FOR TEST. *By B. J. Hurren* 95
EDUCATION IN THE ROYAL AIR FORCE. *By Group Captain C. W. Pollock, M.A., R.A.F. Education Branch* 98
DEVELOPMENT OF AIR TASK FORCES AS A MEANS OF SECURING WORLD PEACE. *By Flight Lieutenants G. W. W. Waddington, D.F.C., and Eric Cook, D.F.C.* .. 103
SELECTION FOR LEADERSHIP IN THE R.A.F. *By W. G. Sheppard* 109
A SYNOPSIS OF W.A.A.F. HISTORY, 1939 TO 1948. *By Squadron Officer B. G. Martin* 112
OUR DOMINION AIR FORCES 115
THE AIR FORCES IN PARLIAMENT 120
SPORT IN THE R.A.F. 125
CONCERNING PERSONNEL 128
EDITOR'S NOTES 130
CORRESPONDENCE 133
BOOK REVIEWS 134

ALL RIGHTS RESERVED

LONDON:
GALE AND POLDEN LTD., IDEAL HOUSE, ARGYLL STREET, OXFORD CIRCUS, W.1
AND AT ALDERSHOT AND PORTSMOUTH
Per Post, Six Shillings and Sixpence *Price Six Shillings (Net)*


SPITSBERGEN
GREENLAND
ICELAND
CANADA
U. S. A.
CUBA
BRAZIL
CHILE
AFRICA
USSR
Moscow
TURKEY
PERSIA
SAUDI ARABIA
INDIA
SINKIANG
OUTER MONGOLIA
MANCHURIA
CHINA
JAPAN
MALAYA
AUSTRALIA
Arctic Circle
Tropic of Cancer
Equator
Tropic of Capricorn
Antarctic Circle
ANNEXED BY U.S.S.R.
EAST POLAND · EAST FINLAND
PART OF E PRUSSIA · KURILE Is
ESTONIA · LATVIA · LITHUANIA
BESSARABIA & BUKOVINA (RUMANIA)
CARPATHO UKRAINE (CZECHOSLOVAKIA)
TANNU TUNA · SOUTHERN SAKHALIN
DOMINATED BY U.S.S.R.
EAST AUSTRIA · HUNGARY · E GERMANY
CZECHOSLOVAKIA · POLAND · BULGARIA
OUTER MONGOLIA · YUGOSLAVIA · N KOREA
SINKIANG · MANCHURIA · RUMANIA
ALBANIA · PORT ARTHUR & DAIREN
☭ - Indicates Communist Strongholds

EDITORIAL

OUR FIRST LINE OF DEFENCE

THE Royal Air Force is still undermanned, still lacking in modern equipment and in many respects untrained for war. This is a sweeping statement which, nevertheless, has been made public through the Press and in Parliament time and again.

In general terms these statements are basically true, but we cannot leave them unqualified, in justice to the men on the ground and in the air, who in face of serious difficulties and new problems are carrying on the unequal struggle. Bled white of skilled men in essential skilled trades, struggling to meet an ever rising cost of living, without the compensating increases in pay enjoyed by their counterparts in civil life, loss of war-time amenities and some pre-war ones too, separation from wives and families owing to lack of accommodation; in the face of all this discouragement they are doing a fine job of work.

Without any fuss and without the usual publicity this patched-up air force of ours is playing no small part in the world-wide British task of restoring law and order and maintaining peace in the Far East, Africa, Middle East and Europe. Those who have watched the magnificent efforts of the Royal Air Force in maintaining, in all weathers and despite innumerable difficulties, the Berlin Air Lift, will realize to what heights of achievement they can rise when called upon in emergency. Here one witnesses the spirit of the Battle of Britain—self-sacrifice and service. It will be clear to all that we still have material for a sound foundation upon which we should now rebuild an air force. One capable of withstanding the heavy onslaught which might fall at any time upon our first line of defence. Rebuild it we must, as a deterrent to aggression and as a safeguard should war become unavoidable.

Three months ago Viscount Templewood, Viscount Trenchard and Viscount Portal were unanimous in their concern at the Government's failure to provide the Royal Air Force with the right men in sufficient numbers. Last year Marshal of the Royal Air Force Lord Tedder, Chief of the Air Staff, expressed his grave concern at the failure of the present recruiting scheme to provide anything like the required number of skilled men to maintain the efficiency of the air force.

These warnings came from men who have held the highest posts in the field of air power, and any government which has the defence of this country at heart would do well to take heed of such grave warnings.

As time drifts by little, if any, improvement is to be seen in the readiness for war of our first line of defence. The international tension does not lessen. Is it to be wondered at that our anxiety for the safety of our country increases and becomes tinged with impatience at the delay? Whilst realizing that on our industry depends our financial stability, without which we cannot support defence forces, yet we are not prepared to accept any suggestion that we cannot afford an air force of a size and efficiency which will give us security and might still be the deciding factor which would prevent an aggressor from plunging us into a third world war. We cannot afford not to make such provision. It is an insurance against losing everything, not only our industries and the means of financial stability but our continued existence as a nation. Our Government, fully aware of the uncertainty of the situation and the great peril of our being the first victim of a world conflagration, will surely put less important matters aside and take immediate action to repair omissions of the past. Urgent national affairs take precedence over party politics and when we are given proof that this is a fact and not a platitude, the citizens of this country will sleep more soundly in their beds. If first things are taken first, we shall be provided with a fully manned, efficiently trained and enthusiastic first line of defence, equipped with the best equipment in the world. What is more, we can then really hope for "Peace in our time."

THE THREAT DEVELOPS

Few will deny there is urgent need to hastily prepare to defend ourselves against possible attack by an overwhelmingly powerful enemy.

What the majority do not realize is that skirmishes in the threatened war have already begun in earnest, mistakenly called the cold war, in which Communists attack civilization throughout the world, and civilization does not fight back. There is very little cold about the war in the experience of our planters who are being murdered in Malaya, or the national armies that have been overwhelmed in China. Our Government is fully aware of this. Mr. Bevin, dealing with what was happening in Malaya, said "... throughout the whole of South-East Asia there is a Cominform and Communist plan to eliminate from that territory every Western association of trade and everything else ... it is part and parcel of a clash between two philosophies and it will keep on breaking out everywhere it can ... if this policy of stirring up civil war as an instrument of policy goes on, as it has gone on ever since the war closed, first in one territory and then in another, no one can foresee the end to which it will lead the nations who are promoting it. For ourselves, I think the Commonwealth itself has now realized the effects of this policy, and wherever it rears its ugly head we shall do our our best to stamp it out. *We shall use our maximum resources to do it.*"

ACTION TO MEET THIS THREAT

The shadow of the threat of a war more terrible than anything we have hitherto experienced, hangs over us (the reason will be dealt with later) and the experts agree that weakness in military strength will surely bring this calamity upon us, but a unified nation with formidable defence forces and high morale may yet prevent another world war.

So far our criticism has been mainly destructive and it is necessary to indicate what action should be taken to remedy the present unsatisfactory state of affairs.

Defence forces numerically strong and well equipped with modern armaments are necessary, but above all a high morale of the nation as a whole is essential. Without either of these no nation can count itself strong enough to resist an attack by an overwhelmingly powerful enemy. What are the essentials in building a nation's morale for war?

Firstly, give the nation a just cause worth fighting for; the loss of which cause would be so serious that to prevent this they would willingly lay down their lives.

Secondly, give the people a Government which, by using the resources of the nation to the best advantage will gain their confidence. Men of integrity, who will hold the nation's welfare above party politics.

Thirdly, appoint leaders in the fighting forces, industry and local government, who by their leadership will be trusted by all concerned.

The main factor upon which morale depends is confidence. Provision of the above essentials would give us all confidence in our cause, confidence in our government and confidence in those under whom we are still called to serve.

Our maximum resources at the moment leaves a good deal to be desired and from an air force point of view what we lack most are skilled tradesmen, and we need not look far to find the reasons. In comparison with civil employment the pay is ridiculously low, prospects unattractive, communal accommodation uninviting, restrictions irritating and there is a reluctance to being sent abroad. These are well-known objections to Service life, but the most important of all is often not realized. Despite the opportunities of free education that exist, too many young men are appallingly ill-informed on the issues and crises that warrant their entry into the Fighting Forces. Our present system of education has failed to give many young men an alert appreciation of their liberties and a consequent explanation of their obligations. (The Russians and the Germans educate the youth of their countries better in this respect.) We have neglected to instil into them at the right age that the continued enjoyment of the freedom given by democracy also necessitates giving service to maintain it against those who would replace it by a less desirable way of life.

What we need is to remedy this omission in our education system with all possible speed. In the meantime we require an entirely new outlook on the provision of skilled tradesmen for our immediate needs. There must be changes of conditions of service which, by comparison with employment in civil life, will offer such inducements as will cause young men to be eager to volunteer for regular enlistment. These attractions cannot be confined to material advantages only, if the morale of our air force is to be high; men must be imbued with a desire to serve and this can only be accomplished by giving them a cause and a cause in which they believe, for which they will serve enthusiastically and gladly, sparing themselves nothing in supporting it.

THE REASON FOR IT ALL—"COMMUNISM"

If the enforcement of Communism by military strength upon any one of the Western Powers becomes a cause for war, everyone, and particularly members of the Fighting Forces, should study very carefully the intentions of those who would, by insidious propaganda or force of arms, extend this mode of life until it envelops the whole world. Having convinced ourselves that this is indeed the intention of the U.S.S.R., it would then be advisable to study Communism and decide whether it would be acceptable to a people who, since earliest history, have always been prepared to lay down their lives in defending "the right to be free."

We cannot imagine the working men and working women, the backbone of Britain, who are always so insistent on "having their rights" taking kindly to a dictatorship which only recognizes force and disowns as enemies of the State such things as Magna Charta, the Bill of Rights and Habeas Corpus.

To clear our minds of any vagueness on the subject we should, without delay, read all we can by unbiased authors of the present way of life of the Russian masses. A study is also recommended of the works of the German, Karl Marx, as well as those of Lenin, to ascertain what Communism has to offer in exchange for those things that have hitherto been our way of life. If we are to lose freedom of speech, Christian beliefs and family life, for what are we to make this sacrifice? Having once capitulated, what would be the fate of those who still believed in "the rights of mankind"?

Before referring at any length to the effects of no law, such as being cast into prison without trial, the concentration and labour camps, let us investigate the simpler matter first; the present intentions of the dictators of the U.S.S.R.

Before Hitler plunged us into a war that has shaken the foundations of the world, *Mein Kampf*, which was compulsory reading in Germany, stated quite clearly the intentions of this would-be "World Dictator." Yet but few in this country read it and fewer still realized how soon the shadow of that book would darken their lives for many tragic and weary years. While the shadow of that book still covers many homes all over the world, another—"a blood-red shadow"—already looms on the horizon. In Russia today Stalin's book, *The Problems of Leninism*, is compulsory reading. The author, in his lust for power, through the dogmatic secular religion of Karl Marx and Lenin, casts a shadow once again over the world, even more menacing than that from which we have barely emerged, in that its potential frightfulness is even more appalling.

This book gives convincing proof of the intentions of Moscow. Let us not make the same mistake twice and treat this evidence in the same light-hearted manner in which we dealt with the broadcast to the German people, through Hitler's book, of his purpose.

Stalin means what he says and clearly intends to bring the free peoples of the world (he calls them imperialist states) under Russian dictatorship.

This is from Lenin, quoted with the approval of Stalin: "The existence of the Soviet Republic side by side with imperialist states for a long time is unthinkable. One or the other must triumph in the end and before that end supervenes a series of frightful collisions between the Soviet Republic and bourgeois states will be inevitable."

The first stage in this world revolution is held to be the original October Revolution in Russia, which caused a break in the system of imperialism and formed the first centre of "Socialism" (note not Communism) in the ocean of imperialist countries, and a mighty base for the further development of dictatorship by the proletariat.

What does this dictatorship of the Proletariat mean? The writings of those apostles of Socialism are perfectly clear on this point. They say ". . . it means nothing more or less than unrestricted power, absolutely unimpeded by laws or regulations and resting directly upon force . . . dictatorship means . . . unlimited power, based on force and not on law."

Convincing proof of the intentions of the dictators of the U.S.S.R., to force their own ideology upon those who are not strong enough to face a clash with the military might of Russia, can be seen by studying the map accompanying this editorial. The blood-red octopus of Communism has stretched forth its tentacles all over the world. The poison of propaganda in these tentacles (or Fifth Column activities) has already rendered many erstwhile free peoples weak and helpless. By causing a succession of industrial strikes, class-hatred and bitterness, the morale of these nations has been undermined, as has their financial stability and they have one by one been gathered into the shadow of the octopus. Freedom of speech and action of individuals has gone, religious beliefs been suppressed, all now sway this way and that to the whim of a dictator that disregards law, religion or the human rights of man. The fate of those that resist is the labour camp, the concentration camp or even worse.

A Cause Worth Fighting For

To resist such a fate is surely a just cause worth fighting for; the loss of which cause would be so serious that to prevent this we would willingly lay down our lives.

To us the hosts of evil seem countless and well armed; what of the armies of Christian civilizatio and free society? Are they equally prepared to resist them?

ORGANIZATION OF DEFENCE IN THE U.S.A.

(A summary of an article which appeared in "The Times" on 11th January, 1949, made and published here with the kind permission of the Editor.)

In the Editorial of the July, 1948, number of the R.A.F. QUARTERLY, a summary was given (based on an article by the Washington Correspondent of *The Times*) of the various functions and responsibilities of the American Armed Forces and of their Joint Chiefs of Staff. Here we offer a further summary (based on an article by the Military Correspondent of *The Times*, which appeared in that newspaper on 11th January, 1949) of the Defence Policy of the U.S.A., as indicated by the First Report of the Secretary of Defence, Mr. Forrestal.

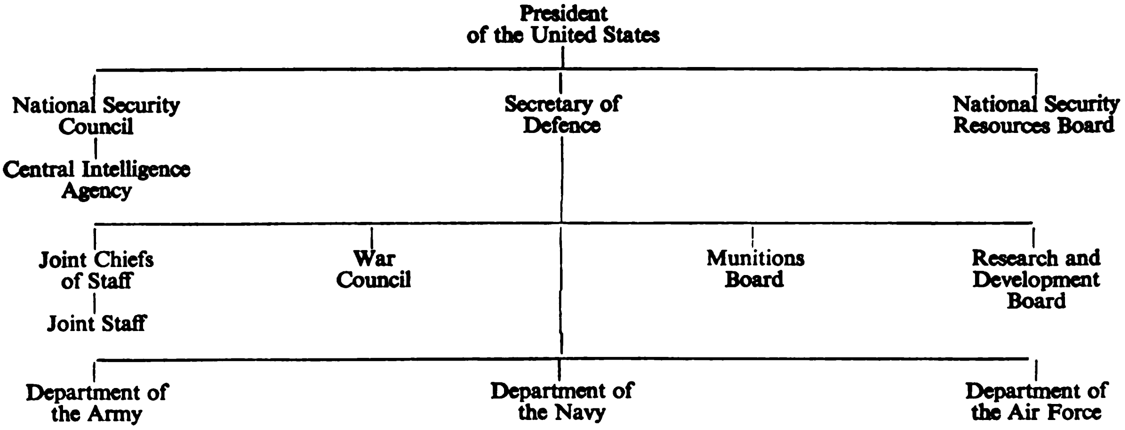
Since 18th September, 1947, the Armed Forces of the United States of America have been on a single establishment, as constituted by the National Security Act of 1947, and called the "National Military Establishment."

During the period covered by Mr. Forrestal's report, the steady decline in the strength of the Armed Forces, due to demobilization, was reversed and a fresh building up took place. This was the response of the United States Government to the apparent instability of the international situation, backed by a realization by the American people that their security, as well as their other interests, must depend upon their being strong enough to withstand and defeat any possible aggressor, however far away his bases might be. And this defensive strength was also found to be a necessary bargaining counter in the game of international politics and economics.

CO-ORDINATION

The first year of unification has seen much progress in all directions. Strategic plans have been drawn up, the roles of the three Services have been defined, the production and purchase of essential supplies have been co-ordinated, plans have been made for reserves in emergency, for civil defence, for medical services, for joint training and for the consolidation of the air transport service. Three unified Commands have been established overseas: the Caribbean under the Army, the Pacific under the Navy and Alaska under the Air Force. Military justice and pay and pensions are also centralized. As one example of co-ordination, "The Army now buys all food, the Navy all hand-tools and the Air Force all photographic equipment."

The chain of responsibility is indicated by the accompanying diagram, which has been copied from *The Times*, of 11th January, 1949, with the kind permission of the Editor.


President of the United States
National Security Council
Central Intelligence Agency
Secretary of Defence
National Security Resources Board
Joint Chiefs of Staff
Joint Staff
War Council
Munitions Board
Research and Development Board
Department of the Army
Department of the Navy
Department of the Air Force

The Joint Chiefs of Staff are responsible for strategic planning with the assistance of the Joint Staff, whose functions are divided into strategic plans, intelligence and logistic plans. The War Council, which advises the Secretary of Defence on matters of broad policy, consists of the Secretaries of the Army, Navy and Air Force and of the three Chiefs of Staff.

INDUSTRIAL MOBILIZATION

The main functions of the Munitions Board are "the planning of military industrial mobilization and the co-ordination of military production." It is also responsible for "stock-piling." It has actually prevented the loss to the State of essential munition plants. "Now, under a 'National Security clause,' thirty per cent. of the war plants are maintained in condition to revert to war production on 120 days' notice, in addition to arsenals and reserve plants retained."

RESEARCH AND DEVELOPMENT

The Research and Development Board advises the Secretary of Defence on scientific research in all fields. It is, and will be, assisted by no less than nineteen specialized committees, e.g., Aeronautics, Atomic Energy, Electronics, Guided Missiles, etc., etc. "The (U.S.) Government," writes *The Times* Military Correspondent, "is now spending on research and development twenty times as much as it spent in the year 1940." And the same authority says: "There can be no doubt that the administrative machinery has become increasingly effective."

In the words of the report itself, the United States "has grown stronger during the fifteen months since the National Service Act of 1947 became law."

PROGRESS OF WESTERN UNION

"Decisions taken now and in coming months will affect the pattern of the civilization to which we are accustomed, and will show how far Western Nations are able to break down traditional barriers and find a way of preserving their common heritage."

This quotation, from the Foreword to a Syllabus of Lectures on Western Union arranged by the University of London in February, March and April this year, is peculiarly apt in view of the statement issued by the Secretary-General of the Brussels Treaty Permanent Commission in February. The statement announced that the Permanent Commission of the Brussels Treaty had examined detailed plans for a Council of Europe; and, while recognizing that no final conclusions could be reached until a conference had been called at which it was hoped other European nations would be represented, the Commission made recommendations to the following effect:

(*a*) The Council of Europe should consist of (i) a Committee of Ministers and (ii) a Consultative Assembly.

(*b*) The Committee of Ministers, which should consist of one Minister from each member state, should discuss all matters of common interest except national defence and should prepare the work of the Assembly.

(*c*) The Consultative Assembly should be a deliberative body without legislative or constituent powers, and it should make recommendations to the Committee of Ministers. It should not only discuss matters referred to it by the Committee of Ministers but it should also be empowered (i) within limits to discuss on its own initiative any matter of common interest, especially economic, social, cultural and juridical problems, (ii) to promote unity among the member states, and (iii) "to consider methods for developing among the European peoples a better understanding of the principles which form the basis of their common heritage." The Assembly should meet normally once a year and its proceedings should be public.

And so the constitution of Western Union begins to take shape. The two bodies which it is proposed shall form the Council of Europe have been wisely planned and their powers left delightfully and appropriately vague. Any more precise definition at this stage might have been fatal.

The Consultative Assembly, meeting in public, will provide the machinery for informing the peoples of matters which concern their welfare; and it will, if it functions properly, be at once a guide to, and a reflection of, public opinion, without the support of which no reform can hope to succeed. The Committee of Ministers, whose meetings will presumably be secret, will provide opportunities for diplomatic negotiation on orthodox lines without which, as we have pointed out in this column on a previous occasion, international differences cannot be satisfactorily solved. Thus the proposed Council of Europe will offer opportunities for both open and secret diplomacy—a singularly reasonable solution to the problem.

The next step will obviously be to invite other nations to join Western Union and to send representatives to the Consultative Assembly and Ministers to the Committee of Ministers; for it is not considered wise to proceed further without support wider than that of the five Brussels Treaty Powers (Britain, France and the Benelux Group). Italy must obviously be invited, and probably Portugal. Switzerland, too, might consider it to her advantage. Spain might also be approached, for strategic reasons. But whether

Western Germany can be incorporated must depend to some extent upon relations with Russia.

AMERICA'S NEW ROLE

President Truman was not long in taking advantage of the augmented prestige and authority which his re-election gave him, and of the additional support which he now has in Congress. In his Inaugural Address on 20th January, 1949, he declared quite plainly his policy in view of the present international situation. This policy may be summed up under four heads:

(i) To support the United Nations.
(ii) To continue Marshall Aid.
(iii) "To strengthen freedom-loving nations against aggression."
(iv) "To make available for the improvement of under-developed areas the benefits of American scientific and industrial advances."

The first two may be said to have become established policy, but the other two are new. It is a new departure for the U.S.A., in peacetime, officially to offer to "strengthen" any other nation, even for defensive purposes; but it is clear from what the President said that he had in mind the Atlantic Security Pact.

The fourth proposal—that the U.S.A. should share its "know-how" with less advanced nations —is almost revolutionary. There will probably be considerable opposition to this proposal from vested interests in America. The American business man is not unpatriotic, but he is naturally jealous of his monopolies; and he may well claim that in safeguarding them he is studying the interests of his country. Apart, however, from the need to raise up allies, even among smaller and less advanced nations (e.g., the Latin-American Republics), in face of the growing menace of aggressive Communism, there is a growing realization, in the U.S.A. as elsewhere, that prosperity can be fully enjoyed by one nation only when the standards of other nations rise simultaneously.

For that reason, among others, we welcome President Truman's forthright declaration and wish him success. And we congratulate both him and the great nation he leads upon their acceptance of the new roles in which Destiny has cast them: champions of freedom and leaders in the march of progress.

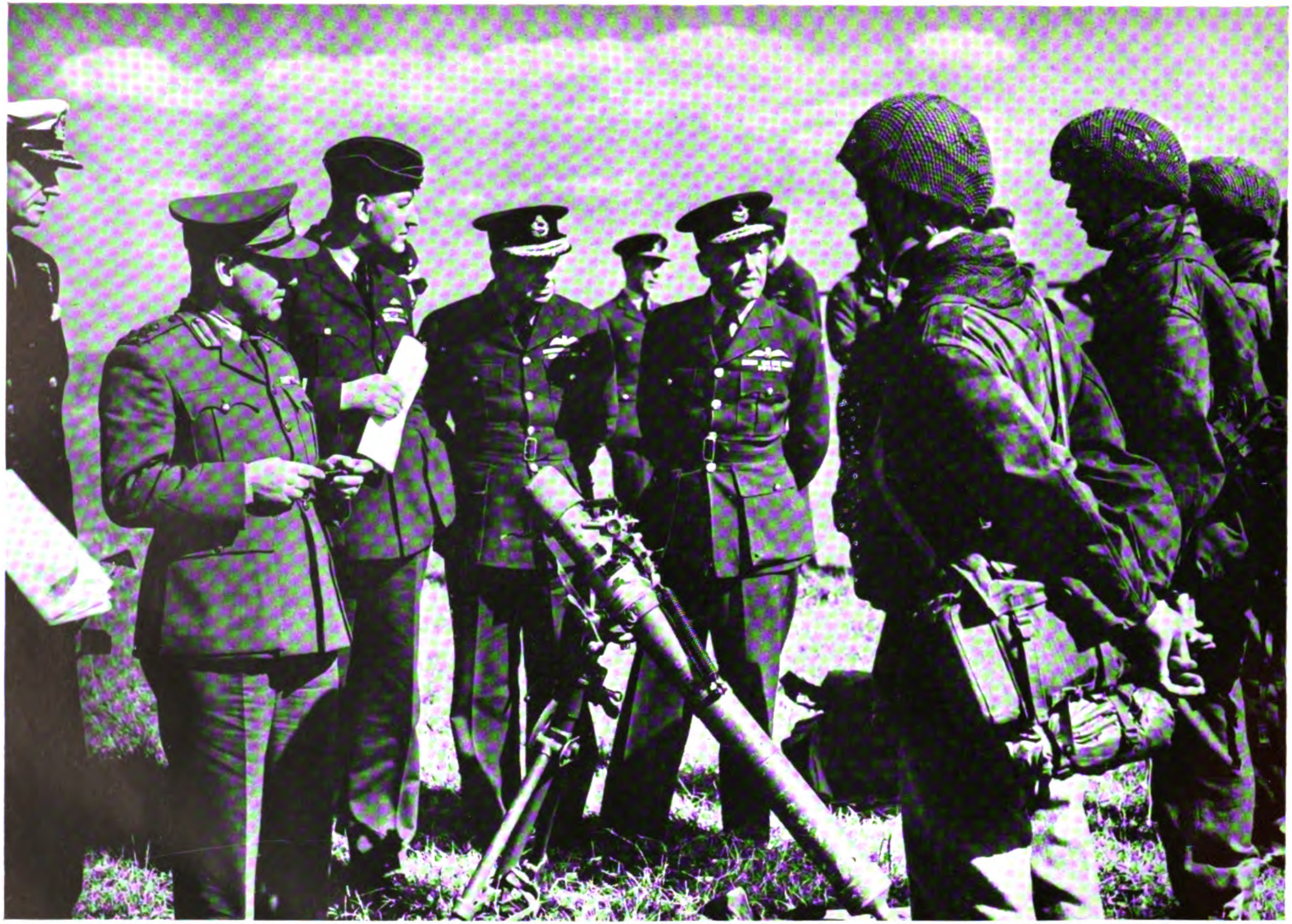
GENERAL EISENHOWER'S NEW APPOINTMENT

We note with interest a message from the White House dated 11th February, 1949, and published in *The Times* of the following day, as follows:

"The President has announced that arrangements have been completed whereby General Eisenhower has been temporarily assigned as Principal Military Adviser and Consultant to the Commander-in-Chief and the Secretary of Defence. In this capacity he will sit in meetings of the Joint Chiefs of Staff and act as presiding officer of that body. Out of consideration for General Eisenhower's other commitments, it is planned that this arrangement would be of relatively short duration."

"At all levels, command, group, station, squadron and individual, you have had to face and are facing great difficulties, administrative, technical and personal; nevertheless, true to the great tradition of our Service, you have refused to let any difficulties prevent you from doing the job, and you have achieved a miracle."

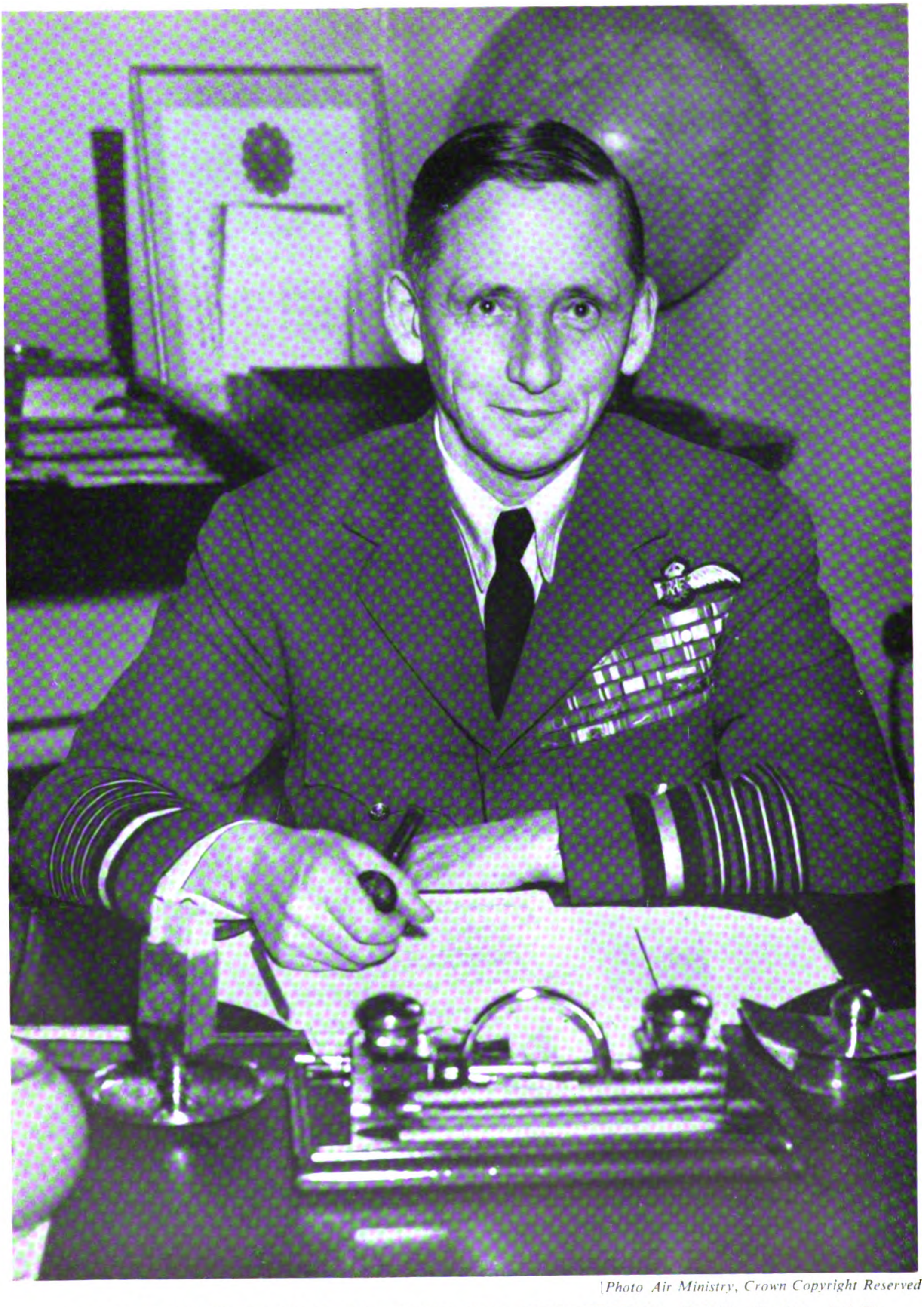
—Marshal of the Royal Air Force Lord Tedder, to all engaged on the Berlin Air Lift.



COMBINED OPERATIONS

Inspecting a 3-in. Mortar crew after parachuting from a close support Halifax Squadron.

Left to Right.—Rear-Admiral R. H. Dickson; Brigadier R. King, C.B.E.; Air Vice-Marshal C. B. S. Spackman, C.B.E., D.F.C.; Air Commodore R. H. G. Neville, O.B.E., M.C.; and Air Vice-Marshal R. E. McBurney, C.B.E. (Royal Canadian Air Force).



[Photo Air Ministry, Crown Copyright Reserved

MARSHAL OF THE ROYAL AIR FORCE THE LORD TEDDER, G.C.B., D.C.L., LL.D.

Face Page 71

Marshal of the Royal Air Force The Lord Tedder, G.C.B., D.C.L., LL.D.

BIOGRAPHY BY A. H. NARRACOTT

ALL the world knows Marshal of the Royal Air Force Lord Trenchard—the indomitable "Boom"—the "Father" of the Air Force, the man who fashioned the infant Service and then, more than once when it was at low ebb, nursed it back to strength and vigour. Trenchard is still crusading for air power with undiminished determination, but the tremendous task of rebuilding the R.A.F. from the remnant left over after the release of a million war-time members has fallen to Marshal of the Royal Air Force Lord Tedder, Chief of the Air Staff.

Trenchard's task was to build up our air power at a time when it was regarded by members of the older Services as, at best, a useful adjunct to their own weapons. Those days have now passed; the achievements of the R.A.F. during World War II convinced even the most die-hard doubters that it was a power in its own right, no longer an auxiliary of the Army and Navy but a dominant factor which could turn the tide of a whole campaign, whether it was fought on land, on water or in the skies. The Government's realization of the true value of air power has prompted it to make the R.A.F. the country's first line of defence. Tedder's responsibility is to fit the R.A.F., in numbers and quality, for this distinction and grave responsibility.

The uphill fight for recognition of the air arm having been won, the need now is to educate the nation, and particularly the other two Services, in its correct use; to ensure that it is never misemployed through ignorance of its correct application. This is no new task for Lord Tedder. Just as Trenchard was the prophet of air power, so the present C.A.S. has been the consistent teacher of the proper use of the air in war.

Right from the time when he first came into prominence as a war leader Lord Tedder has never ceased to preach from the same text—that the three cardinal principles for employing an air force in battle are concentration, flexibility and mobility. Over and over again he has emphasized that no effort must be squandered by being "doled out in penny packets" for the thousand and one jobs for which an air force may be used; if it is to intervene with greatest effect its weight must be centred on the main obstacle in the path. To make such concentration possible the air force must be flexible, so that squadrons can readily be switched to the main task; and flexibility demands mobility, so that squadrons can move quickly, without the retarding effect of heavy equipment, to the point where their help is needed.

Those principles were applied relentlessly and consistently throughout the memorable campaign in North Africa, where the land-air team consisting of Tedder, Coningham, Harry Broadhurst, George Beamish, Auchinleck, Alexander and Montgomery, gave the most convincing demonstration the world had yet seen of how an army and air force, working in close concert, could check, defeat and then utterly rout the most formidable opposition. It was here that a new term—the "Tedder Carpet"—was added to Air Force vocabularies. When the enemy stood in the way of progress a corridor was hewn through by bombing and the Army advanced along it. It was a practical demonstration of concentration, which would have been impossible without flexibility and mobility.

The lessons learned in the desert were applied with devastating effect during the final overthrow of Nazi Germany after the Normandy landings. The air battle was won first—a vital pre-requisite. When the Luftwaffe could no longer intervene effectively, the Anglo-American Air Forces co-operated closely with their Armies and the opposition was inexorably swept back.

Of Tedder's place in history as a great war leader there is no doubt; his achievements in North Africa and later as Eisenhower's Deputy Commander of the great Anglo-American forces, clearly earn this distinction. Now he is tackling the equally difficult problem of rebuilding the R.A.F. as a balanced force, capable of using new weapons. It is as yet too early to know the verdict history will record of this effort, but if Britain is to be safeguarded against attack success is vital.

It would be difficult to find a more charming personality than Lord Tedder. He has a quiet, whimsical humour, and though he can be a devastating critic he is essentially kindly and, above all, human. The R.A.F. can rarely—if ever—have had a more popular C.A.S.

Here are the biographical details: Arthur William Tedder was born on 11th July, 1890, in Stirlingshire, and educated at Whitgift School, Croydon, and Magdalene College, Cambridge, where he graduated B.A., historical tripos, in 1912, and was awarded the Prince Consort Prize in the following year. He had just embarked on a Colonial Office career when World War I brought him home from Fiji to rejoin the Dorsetshire Regiment, in which he had received a pre-war commission. Having served in France, in 1916 he was seconded to the R.F.C. and fought with No. 25 Squadron (which flew F.Es.). Later he commanded No. 70 Squadron (Sopwith two-seaters). Three times he was mentioned in despatches.

In 1919 came a permanent commission in the R.A.F. with the rank of squadron leader, and a year later Tedder commanded No. 207 Squadron, which in 1922-23 formed part of the expeditionary force sent to Constantinople. While taking a course at the Royal Naval Staff Collegt, Greenwich, in 1924, he was promoted wing commander, and for the next two years he commanded No. 2 Flying Training School at Digby. There followed a period in the Training Directorate at the Air Ministry, and in 1928 he attended the Imperial Defence College. From 1929-31 Wing Commander Tedder was an instructor and Assistant Commandant at the R.A.F Staff College, in the latter year being promoted group captain. His next appointment (1932-34) was in command of the Air Armament School at Eastchurch, a command which included all the armament training camps, after which he returned to the Air Ministry as Director of Training, with the rank of air commodore. From October, 1936, he was A.O.C. Far East, with headquarters in Singapore, and was promoted air vice-marshal. In February, 1937, he received the C.B.

When the R.A.F. was being expanded to meet the Hitler threat, in June, 1938, Air Vice-Marshal Tedder was appointed to the new post of Director-General of Research and Development, and he still occupied this office when war started in 1939. On the formation of the M.A.P. in 1940 he became Deputy Air Member for Development and Production, but only three months later he was sent to the Middle East as Deputy A.O.C. and promoted air marshal. Six months after his arrival in the Middle East Tedder succeeded Sir Arthur Longmore as A.O.C.-in-C., and so began his long and successful association with Auchinleck, "Alex" and "Monty." In January, 1942, his services were recognized by a K.C.B., and in the succeeding year he was promoted G.C.B. In July, 1942, he became air chief marshal.

In February, 1943, Tedder was appointed Air Commander-in-Chief, Mediterranean, under Eisenhower, responsible for all Anglo-American air operations in the theatre. This partnership with General Eisenhower continued until after the Germans had surrendered. In December, 1943, Eisenhower became Supreme Commander of the Allied Forces preparing to invade Western Europe, and Tedder was appointed his Deputy.

In September, 1945, Air Chief Marshal Tedder was promoted to the rank of Marshal of the Royal Air Force, and in the New Year Honours of 1946 was created a Baron. He succeeded Lord Portal of Hungerford as C.A.S. on 1st January, 1946.

In 1915 Tedder married Rosalinde, daughter of Mr. W. Maclardy, of Sydney, N.S.W., and they had two sons and a daughter. His eldest son was in Bomber Command and was lost over France during the Battle of Britain. His wife was killed in an air accident in the Middle East in January, 1943, while returning from a visit to R.A.F. hospitals. In the following October he married Mrs. Marie de Seton Black, younger daughter of Sir Bruce Seton, and they have a son.

"In the last war we were lucky to have a breathing space which gave us a chance to increase our war preparations. This will not happen again and the Territorial Army and the Royal Auxiliary Air Force must be ready to go into action immediately."

—Under-Secretary of State for Air.

High-Speed Interception

By Squadron Leader H. R. Allen, D.F.C.

SINCE the finish of the war and consequent upon the development of the—popularly called—jet engine, the maximum flying speed of aircraft has been greatly increased. The barrier to even greater speeds, and this is slowly being beaten down, is the physical change which occurs in the nature of airflow as the speed of sound is approached.

This increase in possible flying speeds brings with it many difficult and complicated problems, structural, physical and human. Not the least of these, and one with which air forces must concern themselves, is that of bringing the guns of a defending fighter to bear upon an invading aircraft flying at great speed and varying height.

The faster the target moves through the air the sooner it is able to use its weapons and make its getaway, and the more limited the opportunities of the defence to destroy it. And when this is added to the shield which the blackness of the night hands to the attacker, the magnitude of the problem becomes plain.

REVIEW OF RAID REPORTING AND CONTROL METHODS SINCE 1939

When the last war began we were fortunate in having a number of early warning radar stations and an Observer Corps manned by devoted, civilian volunteers.

The radar stations were of the C.H. (Chain Home) and C.H.L. (Chain Home Low) types. C.H. stations gave excellent early warning of invading aircraft, provided they flew at high or medium altitudes. C.H.L. stations, as the name implies, were designed to "see" aircraft flying at fairly low heights. Both types suffered from the serious disadvantage of inability to give the height of approaching aircraft with any degree of accuracy. Indeed, information of range, bearing and numbers of approaching aircraft was often very erratic. Identification—apart from visual—was non-existent.

The Observer Corps employed numerous posts covering wide areas of the country and observed and reported upon aircraft. Under normal conditions these would be visually observed but in conditions of low cloud and poor visibility observation was aural. Its members were skilled in aircraft identification—except aircraft flying at impossibly great heights—and were excellent at judging altitude and bearing. The information thus obtained was passed back to R.O.C. centres and thence relayed on to R.A.F. operations rooms by land-line.

At Fighter Command, Group Headquarters and Sectors there were air information tables where all available information on the disposition of friendly and enemy aircraft was displayed. Our own fighters were fitted with an apparatus which caused transmissions to be automatically sent out, when switched on. These transmissions would be picked up by fixer stations which would relay their information to the operations rooms. In this way the position of friendly fighters could be constantly checked. Unfortunately, however, when this apparatus was switched on, pilots could neither hear nor be heard for fifteen seconds of each minute; this was not only a nuisance but could be, on occasion, a positive danger.

Plots received at Sector Operations Rooms had been passed through a Filter Room where the best possible plot was accepted and passed on. This plot would duly appear upon a table at Sector upon which a map of the area with a grid had been superimposed. It would be shown as an arrow and would be placed in position by an airman or airwoman who would be given the necessary grid reference via his or her headphones. Thus, as more and more plots were received, a complete track of enemy and friendly aircraft could be recorded. A simple but effective method was applied which enabled old or "stale" tracks to be removed from the table before they could be allowed to confuse the issue.

The job of the Sector Controller was, then, to cause the tracks of the defending fighter, under R/T orders, to coincide with the van of the invading track, having made allowance for relative speeds, varying altitudes, wind speeds and so forth, when the interceptor should—theoretically—be able to see the enemy and make its attack.

At night, fighters were aided, in theory, by searchlights and anti-aircraft shell bursts (always provided that the latter happened to burst near the enemy and not near friendly aircraft!).

All the above shows only the bones of the raid reporting and control system as it was. There were many other refinements which it is not necessary to illuminate here. On the whole it worked very well for the prevailing conditions and it is certain that the Battle of Britain could not have been won without it. Its limitations and inaccuracies were a multitude, however, and it soon became necessary to modify and improve on it.

After the Battle of Britain had been won the Germans turned their effort to night bombing and it was soon discovered that the system outlined above was pretty well useless against such attack. One of its worst drawbacks was the time lag which occurred between the sighting of the enemy by the radar operator or the R.O.C. post and the positioning of the arrow in the Sector Operations Room. If the process of sighting and roughly identifying the target, transmitting the information back to the Filter Room, where it would be put under a quick selective examination before being transmitted onwards to the Sector, took one minute, an aircraft fiying at 200 m.p.h. would move three miles in an uncertain direction in that time. This would mean that the recording arrow was already three miles out of position at the moment it was placed in position. In the same way the recorded position of the defending fighter could be several miles from its true position, in time and space, and the combination of the two errors could be considerable.

At night, when visibility could often be measured in yards rather than miles, such an error would make the whole system useless and some means had to be found to improve the all-round efficiency of it. Accordingly the G.C.I. (Ground Controlled Interception) set was developed and put into operational use. The practical difference between G.C.I. and C.H., C.H.L. equipment was the greater ability of the former to give reasonably accurate range, bearing and altitude data. An improved controlling technique was also implemented and it was not long before the new system became greatly more effective.

The time lag between reports and their translation on to useful terms had to be removed as far as possible. This was done by "handing" the control of interception to the G.C.I. station, which was authorized by a higher formation. Thus the data obtained by the Plan Position Indicators at the Ground Control Interception station could be immediately presented to the Controller without delay and a glance into a P.P.I. could show anyone interested the exact position of the two aircraft—enemy and defending—at the same moment. Thus even small movements of either aircraft could be noticed at the moment they were made and R/T instructions given to the defender simultaneously. This information was also told back to Sector so that the overall Sector picture could be still maintained.

This represented a great improvement but it was made even more effective by the operational application of A.I. (Airborne Interception equipment). This was simply a small, light radar set of limited performance which was carried by defending night fighter aircraft. It gave bearing, range (up to three to five miles) and relative altitude of the target and was operated by a radar/navigator who passed instructions to his pilot. Thus the task of the Controller on the ground was to bring his fighter to within A.I. range of the target and leave it to the combined efforts of pilot and A.I. operator to do the rest. When this equipment was fitted to the high-performance, heavily-armed Mosquito the art of night fighting could be reasonably said to have been completed for conditions then prevailing.

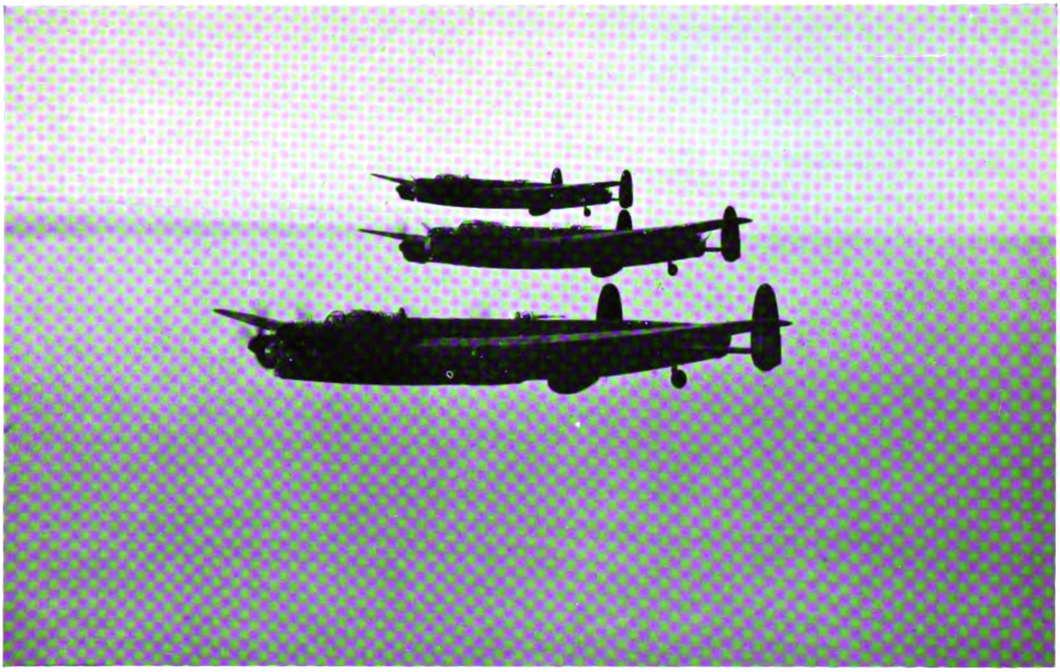
This system greatly expanded and modified saw the end of the war. In the last stages of the war it received, probably, its greatest test when it was called upon to combat the flying bomb by night. These weapons, flying low and at very high speeds, called for every resource, and the figures showing the percentage destroyed give some idea of the magnificent efforts and teamwork of Fighter and Anti-Aircraft Commands.

PROBLEMS OF THE FUTURE

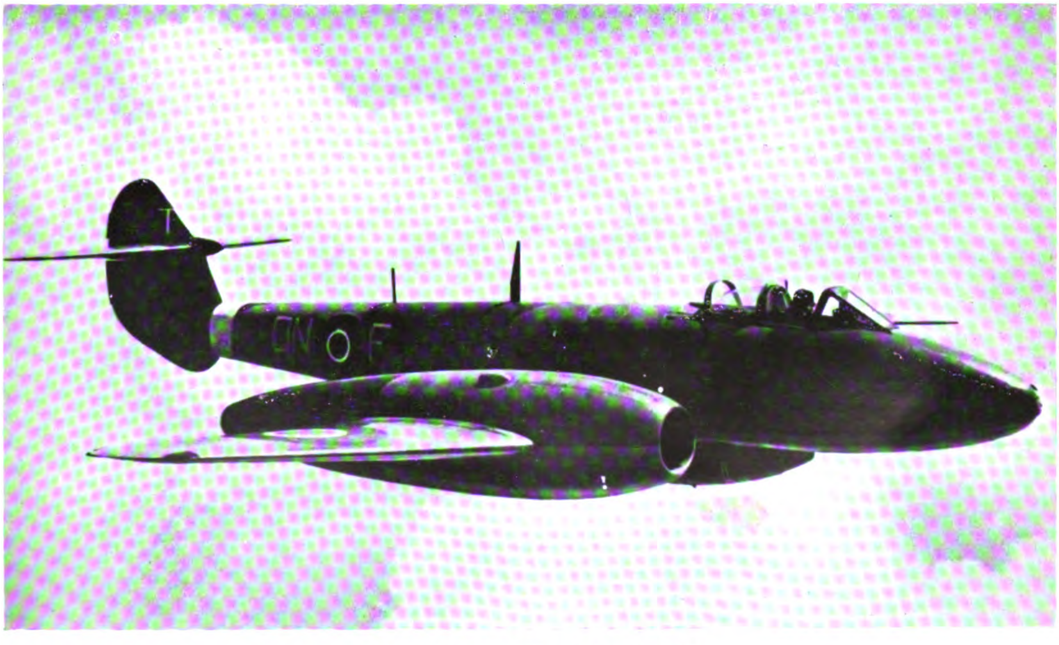
If the speed of sound is allowed to remain a barrier to pilot-controlled flight, it seems probable that the future will bring bombers capable of flying as fast as the best fighter, at least at certain altitudes. This possibility will influence not only the tactics of attack and defence, but also the usage and technique of the ground control of aircraft.

Looking at the ground control aspect first, it is easy to see that there is not the slightest room for delay or hesitancy in the functioning of any part of the system. Going further, there is hardly room for the short time lag which the human body needs between hearing and comprehending, or seeing and comprehending a message and the taking of effective action.

The range of "sight" of radar stations is limited, because radar impulses follow the same natural laws which govern the processes of light rays, e.g., you cannot see around the horizon. To a small extent it is possible to increase range by siting transmitter/receivers on points of high ground, but a limitation here is that a G.C.I. station needs its surrounding terrain to have the best reflecting qualities possible. It may be that



MODERN BOMBER AIRCRAFT



MODERN FIGHTER AIRCRAFT

TAKING A READING IN THE HEIGHT-FINDER TUBE

N.C.Os. WORKING ON THE PLOTTING BOARD

Face page 75

the peculiar breed of men who are popularly named "boffins" may be able to inflict upon light and radar rays alike the property of willingness to be bent away from the predestined courses—in which case we might all be able to see around corners! But this can at the best be described as long-term policy and the immediate problem must be considered within the limits of existing knowledge. The seriousness of this limitation can best be shown by pointing out that there are in existence aircraft capable of flying at speeds in excess of 600 m.p.h. and that the radius of action of a normal G.C.I. station, at mean altitudes, is in the region of thirty miles. Thus the whole field of view of a G.C.I. station can be traversed by a modern aircraft in under six minutes.

Two answers to the problem are required: the short-term policy which should consider the use of existing—if modified—equipment in the most efficient manner; and the long-term policy considering scientific development along a specified, operational requirement. The problem also divides itself between efficiency of control from the ground and the most efficient use in the air of defending aircraft.

SHORT-TERM REQUIREMENTS (GROUND CONTROL)

1. *Range.*—It appears that the existing performance of G.C.I. sets cannot be much improved so far as range is concerned. There are in existence, however, C.H. and C.H.L. sets capable of giving early warning over considerable distances. These sets should, therefore, be tied in closely with the present system. The cost of manufacture and erection is probably too great to warrant more production in a short-term policy, but, nevertheless, full use should be made of existing equipment.

Another method of increasing range with the existing material at our disposal lies in the manner of deployment. Thus, the siting of radar sets in allied territory could appreciably increase the effective early warning given to the United Kingdom, provided that there were adequate communications and good organization.

In the same way the preliminary battles of the air could be fought over Europe, provided there was proper G.C.I. control, which would ease the strain on home-based defensive forces.

2. *Identification.*—The strain upon our defence will be considerably increased unless quick and accurate identification of plots is possible as soon as they are received. Various methods of identification are already available, but none is entirely satisfactory nor infallible.

3. *Radar Cover.*—There should be no gap in our radar cover, either over Great Britain or its approaches, if such extent of cover is humanly possible. In this respect the possibility of ship-borne radar should not be overlooked, both as extra-early warning and as a link in the chain between the United Kingdom and the Continent.

4. *Display.*—The display of radar information must be comprehensible immediately and unambiguously to all users. At the moment displays are two-dimensional, which means that two separate P.P.Is. are necessary to obtain data in three dimensions—range, bearing and altitude. A three-dimensional display is visualized, here, as an improvement likely to save those fleeting seconds of precious time.

5. *Controlling Technique.*—It is obvious that there is little room for the small delays incurred by translating information gained by radar on to a plotting table, before carrying out an interception. The plotting table will still have an importance as a medium of information which the Higher Command will need when allowing for adequate reserves and reinforcement in fighting the battle; but it will now be useless to an interception controller trying to bring one aircraft within gun-shot range of another when both might be flying at speeds in excess of 600 m.p.h.

Therefore, a Controller gaining his information electronically at the speed of light, must transmit his instructions, within the time limit allowed by the human brain, at the speed of light—via his radio transmitter. It is here that a three-dimensional display might give him a quicker mental picture which would reduce what might be called "brain time." In any case all interceptions will have to be made via the P.P.I. and not by means of the plotting table.

The acceptance of this fact will call for careful planning to avoid the saturation of G.C.I. stations.

6. *Jamming.*—In the last war radio/radar counter measures were most successfully used against the Germans. It is a horrifying thought that our complete system of ground controlling might be paralysed, in war, by similar means. Our scientists must be called upon to pit their wits against their own invention and, at the same time, controlling technique must be adapted where possible to counter such a menace.

LONG-TERM GROUND CONTROL REQUIREMENTS

1. *Policy.*—The future policy for raid reporting and control systems will depend very largely upon the nature of the future defence against attack from the air. If attack from the air comes with guided missiles travelling at thousands of miles per hour, then the conventional pilot-controlled fighter aircraft will be useless as a defence.

There will be little use, therefore, for G.C.I. stations in the sense that we know them. Defence against such missiles would be confined to guided defensive missiles or to electronic rays capable of exploding the attacking weapon in the air. But such Wellsian, head-scratching is best left to those properly qualified.

What seems reasonable to assume is that there will be a period before the era of very-long-range, guided missiles when pilot-controlled aircraft will fly at speeds approaching and perhaps exceeding that of sound. During this intermediary period the defence will devolve upon anti-aircraft artillery of greatly improved performance and fighter aircraft fitted with weapons capable of destoying the enemy once interception is effected. It is upon this assumption that we must base our long- (as opposed to ultra-long) term requirements.

2. *Automatic Homing.*—During the last war the Allies and Germans discovered the technique of intercepting aircraft by using their radar receivers for homing aircraft on to target aircaft using radar equipment. It does not seem beyond the realms of probability, therefore, for science to arrive at a pitch of development when interceptor fighters can be set to home automatically on to a selected target, whether it be carrying radar equipment or not. The work of the ground controller would then consist of ordering his fighter off the ground, setting it upon its course, selecting its target and then leaving it to its own devices. The pilot, after flying off the ground and setting his radar equipment on the orders of the ground controller, would leave the interception to an automatic pilot and take over control for the final approach and "kill."

3. *Automatic Plotting.*—Even if interceptions are carried out via P.P.Is. the plotting table will still fulfil an important function. It gives the Chief Controller at a G.C.I. station information on the disposition of friendly and enemy forces in his area of responsibility. In the same way it gives the larger picture to the Group Commander and the overall picture to the A.O.C.-in-C. Fighter Command. It is important, therefore, that there is the least possible delay in recording the position of aircraft in time and space. The plotting of aircraft on the table at the moment is dependent upon human plotters (who therefore suffer from "brain time"), who are told aircraft positions via land-lines. If some means could be devised whereby blips received in P.P.Is. could be automatically plotted, by mechanical or other means, delay which now occurs could be obviated. Even if this development is possible, however, it is still felt that there would be a need for a three-dimensional display on the plotting table as well as the P.P.I.

AIR ASPECTS AND TACTICS

It is obvious that when the 500 m.p.h. jet-propelled bomber becomes a reality, the tactics of defence and attack will alter considerably. Our interest here is defensive, but as defensive tactics are conditioned by the different methods of attack the tactics of the invading bomber force must also be considered.

1. *Altitude of Attack.*—It is difficult to generalize here, but the following factors must be considered:

(*a*) The jet engine gives its best endurance at height.
(*b*) Navigation at low altitudes can be a difficult and sometimes hazardous operation.
(*c*) The size and type of bomb to be carried is limited, if the intention is to bomb at low level.
(*d*) Light and medium flak can be extremely effective against low-flying aircraft.
(*e*) Balloon barrages are good dissuaders.
(*f*) Manœuvrability is adversely affected at low height because of lack of airspace.
(*g*) Formation flying is difficult and tiring when confined to low altitudes and a formation becomes unwieldly.
(*h*) Fighter escort is practically impossible.

But:

(*i*) Low-flying aircraft effectively reduce the range of existing radar equipment.
(*j*) Aircraft camouflage is effective against the ground, when viewed from above.
(*k*) Fighter attacks against low-flying aircraft can be hazardous and defending rear-gunners can concentrate upon their vulnerable area above and behind.
(*l*) Anti-aircraft artillery has a very fleeting target.

After considering these factors it seems probable that the majority of bomber attacks will be made at reasonably high altitudes.

2. *Formation.*—Will attacking bombers fly in formation in the future or not? By night the answer remains in the negative, but by day it is problematical. A bomber formation allows its gunners great concentration of fire; its compactness allows fighter escorts to give increased cover; its bombs, all falling on and around the target simultaneously, make for greater precision. On the other hand, the time taken for a bomber force to join formation is considerable and the jet-propelled bomber would use a lot of fuel in

this process. Again, bombers capable of flying at speeds in excess of 500 m.p.h. might saturate the defences more effectively if the "stream" technique, with defending fighters interposed at frequent intervals were adopted, especially if they were routed with imagination and subtlety.

Whatever the answer it will have a great influence upon tactics employed by our defensive fighters.

3. *Enemy Strategy in the Air.*—The last war lies so close behind us that, perhaps, we have been unable, as yet, to learn the lessons which it contained. The rubble still lies in many of the great cities of what was Germany. The rubble knows the answer, but do we?

However, there have arisen from all the slaughter material, indisputable facts:

Firstly, that supremacy in the air confers an immense advantage to our forces in the field and upon the seas.

Secondly, that without air superiority land and sea battles cannot be won—provided the enemy takes full advantage of his air supremacy.

Thirdly, that the importance of air attack upon communications in support of land and sea forces can scarcely be over-emphasized.

Fourthly, that the will to resist of a strong people may weaken but is unlikely to dissipate under heavy air bombardment.

DEFENSIVE FIGHTER TACTICS

From the foregoing it is possible to make the following assumptions, if war on a continental scale begins before the Wellsian era of guided, very-long-range missiles:

(*a*) That the enemy will first attempt to gain air supremacy.
(*b*) That his bombers will generally attack at above medium altitude and may use the "stream" technique with defending fighters interposed.
(*c*) That his air attack will pave the way for his invading armies.
(*d*) That communications, which would certainly include port installations, will be a priority target.

Fighter Command has had the honour of bearing the brunt of air attack upon this country before, and it seems probable that, in a future war, that honour would fall to it again. If this be the case, we must first make certain, and it must be remembered that we failed to make this certain in 1940, that our tactics are capable of performing our heavy task.

1. *Formation.*—The importance of fleeting seconds has been emphasized already, when considering aspects of ground control. Are we to lose what we gained on the swings, by roundabouting around the circuit waiting for our formation to be joined? Is the conventional runway, which grew upon us in the last war, to be discarded before the next?

It seems imperative that if we are to retain our normal methods of fighter formation flying, all aircraft should be able to take off in one wave across the airfield, without first stacking themselves on the runway. It is a good squadron commander who can get his fighters in squadron formation within three minutes from the time of take-off of the first aircraft. And on the latest performance figures, the leading aircraft could be at an altitude of over 15,000 feet within that time. Perhaps we should revert to all-grass airfields for our fighters, or else make all our fighter airfields into vast tarmac areas—which would surely be an impossible task.

On the other hand, is there any need for fighters to fly in formation to combat the type of attack envisaged? The advantages gained by flying in formation are many, and certainly the ground controller is greatly assisted by knowing that one particular blip represents a force of twelve of his aircraft. If he were confronted by one blip for every one of his interceptor aircraft in his area, there might be little room on his P.P.I. to see the position of the attacking force.

One must refrain from being dogmatic, but it seems certain that the tactics for and against formation interception—especially against large-scale "stream" raids—should be put under a tactical microscope.

2. *Rocket Assistance.*—There is no longer time for taking off into wind. Flights should be dispersed in such a way that immediate take-off is possible, without danger of collision, no matter what the state and direction of the wind. Jet engines usually provide ample reserve of power for such action, but it may be that rocket assistance would be of value in the event. In any case, even though present climb performance figures are staggering (even to die-hard Gladiator addicts!) it would probably be found that rocket assistance during the period of climb would be of the greatest operational value.

3. *Operational Attacks.*—The technique of attack has generally in the past been to use excess height to gain sufficient reserve of speed upon the target. It seems, today, that this can no longer be done—indeed it might be dangerous. Jet engines can already produce sufficient power to bring an aircraft up to its maximum permitted Mach number in a straight and level condition. Admittedly, maximum permitted Mach numbers could be arrived at quicker with the help of a dive, but

this fact is likely to cause more embarrassment than otherwise in combat.

Fighter gunnery was never an easy process and it is not likely to become easier with the advent of very fast aircraft. The "lethal" area in the last war occurred at a range of under 400 yards and an angle-off of less than thirty degrees. A target flying at 300 m.p.h., presenting an angle-off of thirty degrees, would have a relative crossing speed of about 100 m.p.h.—i.e., one ring of a G.M. 2 reflector sight. A target flying at 600 m.p.h. under a similar condition would present a crossing speed of 200 m.p.h. The relative speed ring on a gun sight cannot be enlarged at will; it is limited by the size of the aircraft windscreen among other things. Therefore, the execution of an attack and the aiming before opening fire clearly become more and more complicated as aircraft and target speeds increase.

Yet another complication arises when manœuvrability at high speeds is considered. A normal fit man blacks out at about 4½ g. If he is wearing a G. suit his resistance will be raised to around 6 g. And yet the turning circle of an aircraft flying at 600 m.p.h. under a centrifugal acceleration of 6 g. is still enormous. A series of attacks and breakaways upon an enemy aircraft flying at great speeds will not be practicable, therefore, and the enemy must be killed in one attack.

These are but a few of the implications of 600 m.p.h. interceptions and to mention more would make wearisome reading. Constant study, theory and practice must be the order of the day. And with this study must go adequate circulation of theory and practical results. The reason that we went into the Battle of Britain flying in four tight sections in vic and with the tiniest knowledge of what the circle of a gunsight implied was not so much through lack of training and direction as poor distribution of the knowledge which the other fellow had managed to gain the hard way. Don't let us do this again; life becomes increasingly complex without adding to its complexity.

CONCLUSION

No mention has been made here of the atomic bomb for the simple reason that there seems to be no adequate defence against it: one aircraft must always get through any defence. On the other hand the enormous cost of production of this weapon must call for a target proportionately important. Atom bombs are never going to be hurled around the sky like incendiaries in the last war, and we must hope that sanity will rise from out of the ruins of Germany and confine air forces to their proper role, which is not, or should not be, as agents of the strategy of fear.

Equally, anti-aircraft artillery has not been mentioned. It is not for an airman to tell the Army what to do and how to do it. But with sensible liaison and consultation there is no reason why the great potentiality of this defensive (or all-purpose) weapon should not be properly arrived at.

The Minister of Defence has named the Royal Air Force "Britain's first line of defence." Let us all, by our efforts, be equal to our great responsibility.

BATTLE OF BRITAIN WEEK

Battle of Britain Week will be observed this year from 12th to 18th September.

Battle of Britain Day (Thursday, 15th September) will be celebrated in the usual way, including colour-hoisting parades and other appropriate ceremonial, at all R.A.F. stations.

The R.A.F. "At Home Day" will be on Saturday, 17th September, when a number of R.A.F. stations will be open to the public, and on the following day (Battle of Britain Sunday) there will be the customary thanksgiving services.

Details of the programme for the observance of the Week will be issued at a later date.

The Influence of Modern Techniques of War on Strategy

BY "AQUILA"

PART II

(Part I was published in the January issue)

CONCEPTIONS OF STRATEGY TODAY

Techniques of War in the Twentieth Century

STRATEGY is concerned with making the "means" fit the "end." While the end or aim in war remains constant, the invariable quantities are the continually changing means or techniques of war. In the twentieth century we have witnessed a revolution in the means of war. The first of these was the submarine which has seriously encroached upon the degree of control at sea which may be achieved by naval forces. The second was the invention of aircraft and their adaption to warfare, which has removed the ability of sea or landpower to constitute a barrier against the whole deployment of a nation's main offensive war potential, and therefore the ability of seapower or landpower to secure by themselves a country or its vital interests against destruction. The third is the scientific development of weapons of mass destruction, which constitute so great a degree of advance as to amount virtually to the introduction of a new technique of war.

The submarine has upset the comparatively simple conditions of sea warfare as they existed before this century. The naval strategy adopted against our enemies in order to clear the seas for the safe conduct of our trade and warlike operations was to seek out and destroy the enemy's naval forces. If he refused to fight it out in a trial of strength, then he was blockaded in his ports. Even then it was clearly recognized that any supremacy at sea, however great, could not be an absolute guarantee against the occasional raider pursuing a *guerre de course* against our merchant shipping. The qualities of the submarine allow it to employ a tactic of the indirect approach, giving it the power to evade a blockade and to evade a trial of strength on the high seas, whilst it conducts its *guerre de course*. Although such methods cannot establish a command of the sea in the hitherto accepted sense of the phrase, they can seriously jeopardize our ability to command it effectively. Indeed, in the last two wars we have come perilously close to losing command of the sea in spite of vastly superior surface fleets, and with it our ability to continue the war.

The introduction of aircraft to war has opened up a new system of communications through and along which an enemy may deploy his war potential. As Sir Walter Raleigh has said: "With the conquest of the air the task of self-defence for Great Britain has been doubled.... We must keep the highways open or our freedom is gone. We must command the air. . . . The whole of our naval history is summed up in that sentence: and the whole of our air policy is foretold." The air has imposed upon us new commitments, but it has also opened up new opportunities in the conduct of war. We may now deploy our war potential in a sphere which, when considered in relation to land and sea warfare, is on a strategic plane merging into the war policy of the government. When used on the tactical level as an adjunct to sea or land forces, there are certain facets of air power, such as its range, which are not put to their most advantageous use, and in the perspective of sea or land warfare there are definite limitations to its effectiveness. For instance, aircraft cannot compare with ships for sea-keeping qualities, and in land warfare they cannot possess and defend ground. So long as such qualities are necessary in war, we should retain the most suitable techniques for ensuring that we benefit from them as and when required.

In almost all wars the aim of the fighting services has been to defeat the opposing forces of the enemy. As an illustration, take the case of two duellists armed with revolvers. In wars up to the present time our first aim has been, as it were, to knock the revolver from our opponent's hand so that we can overwhelm him. Today we have a revolver, or rather an atomic bomb, which may be capable of killing our opponent without bothering about knocking his revolver from his hand. If he also has such a weapon, we must be sure to kill him before he can discharge his weapon at us. Thus, the importance of the weapons of mass destruction lies in the part they play as the "means" in our strategy. If they prove as effective as they are expected to be, and if sufficient are available, there can be little doubt that they will revolutionize our strategy in so far that they will play the dominating part in the wars of the future. We must, therefore, be careful not to limit the best use of these weapons by fettering them unnecessarily to former techniques of war where their best effect may be largely mis-spent.

Influence of Modern Techniques in Defence

Our first aim in war must be to ensure the integrity of our homeland, and our second to protect our lines of communication. Owing to the development of new techniques our position as an island and as a main base has become increasingly vulnerable. For instance, in spite of our seapower we have been blockaded in two wars, and we have been subjected in the last to a considerable threat from the air. Moreover, we were seriously threatened with invasion in 1940. Our defence problems today may be considered in the following order in terms of the probable time required to achieve decisive effect:

(*a*) Paralysis from the air.
(*b*) Invasion by air.
(*c*) Invasion by sea.
(*d*) Strangulation by submarines.

The technical and tactical characteristics of air forces at the present time and in the immediate future indicate that the bomber can always get through. With modern speeds, the problems of fighter defence are even greater than in 1940, and the destructive power of air weapons can swiftly become catastrophic. Thus, we are forced to rely for our defence more and more upon the offence in the air, and to destroy the means of the enemy to attack us. It appears that we may find that the only practical way of doing this may be to destroy our enemy utterly. This constitutes the bomber as our vital defensive weapon, and we must ensure that through it we can achieve that command of the air without which our people, industry, docks and lines of communication by sea and land will be at the mercy of the enemy.

An air invasion is likely to involve large numbers of comparatively slow aircraft against which our fighter defences should be highly effective. Our bomber force will, however, be the most effective way of disrupting an invasion at the critical mounting airfields and concentration areas, since we may be able to maintain these operations for a period of time so producing a progressive degree of destruction. Our fighter forces may well be saturated if a tactically concentrated invasion is launched. Thus once again we must ensure that we command the air in order to conduct these offensive operations.

The best method of defending this country against an invasion by sea is to prevent the enemy armada from leaving its ports. Thus once again the bombers will be the first line of defence and will be able to destroy any concentrations of invasion craft, shipping and military equipment in the concentration areas near the ports.

At present there is virtually no method of attacking submarines when they are once at sea, except in purely defensive and escort operations. The probable means which will have to be adopted will be to bottle up the submarines by mining the approaches to their ports, by using attack submarines to prey on the enemy's, as they leave and enter his ports, and by attacking them from the air. Whether the air attack should be against his actual ports, against the communications to them or against the industry producing submarines and equipment will depend upon circumstances. Whatever target system is adopted, it is certain that the bomber will play a major role in the defensive/offensive campaign against the submarine.

Another requirement will be the defence of our bases along our lines of communication. These will certainly include the bulk of the bases already in our hands, and in addition the capture or at least consolidation of one or two strategic points which may not be under our control at the beginning of a war. The need for defending the Middle East will impose upon us a land commitment, which will be confined, as in the past, by the nature of the desert frontiers which surround these areas, to comparatively small but efficient land forces. During the last war the ability of the air forces at our disposal to give substantial support was limited by the prime necessity for concentrating our air power in defence of our main base, and by the very large air effort which was required to produce an effective dislocation of the enemy communications and supplies supporting his armies in the Middle East. It is of the first importance to appreciate what the capacity of the weapons of mass destruction may be in assisting to secure such an area. In the first place the air forces required to produce a particular result will be very much smaller than during the last war. In the second place it is probable that by the proper use of atomic weapons it will be possible to do very much more towards curtailing the enemy effort against us. As in the past, the strategy within a theatre such as the Middle East must be a highly integrated three-Service affair, but it is not unreasonable to forecast that very much greater reliance can now be placed upon the ability of air weapons to keep the enemy at bay. If we find that these weapons can make a contribution which approaches the theoretical effects which we now estimate should be achieved, and if sufficient are available, the defensive problem will be markedly eased in respect of surface commitments. However, we shall have to be prepared for a fierce struggle in the air in order to ensure that our air forces can operate effectively against the enemy, and that they are denied the opportunity of counter-attacking with equal effect.

In occupying bases which are not already under our control, we shall have to be prepared for a scale of enemy reaction which is proportionate to the importance he attaches to denying us the use of that base, and in proportion to the deterrent power which he is capable of bringing to bear against us. If he can cover such a base with his air forces, and assuming he has atomic bombs at his disposal, these two factors will govern his decision to employ them irrespective of the size of surface force which we employ, whether a brigade, division or corps, and whether supported by a fleet of heavy ships or only by escort vessels. Thus, it will be for our air forces to neutralize the enemy's covering air forces, such an operation would be feasible, and this will be the role of the bomber.

Influence of Modern Techniques in Offence

In developing our offensive against the enemy there are, broadly, two strategies which we can adopt . . . the direct and indirect approach. Hitherto our offensive has flowed naturally from our command of the sea, and all its influences. In fact, the power which we have had to maintain for our own security has been adapted to the offence. Accordingly, these operations have been aimed predominantly at the sea perimeter of our enemies, where we can force him to disperse his troops widely. By using comparatively small military forces combined with the great mobility of our sea power we have been able to "knock away his props," gaining an important strategic advantage here or there, or denying him the use of this or that area, port or source of supply. In fact, our strategy was an extension of our blockade. It was an indirect approach which aimed to bring about a Waterloo or an invasion at low cost after withering the enemy's strength. In the particular case of Britain, this was a maritime strategy, the indirect approach preparing the way for the final direct action.

In the light of new techniques of war, we will, no doubt, endeavour to pursue this strategy of indirect approach, using submarines, mining and peripheral operations to blockade him and "knock away the props." However, a new element has been introduced into our strategy which cannot be considered to be indirect . . . air attack of the sources of an enemy's war potential. It is a more direct form of attack than could be made even by armies, which first had to destroy the enemy's land forces before the country's government and its administrative and industrial heart could be taken over. It outflanks the enemy's surface forces and is a direct attack against the main base of the enemy. As such, it is an element which, in accordance with the extent of our reliance upon it for offensive action, alters the conception of our strategy. During the last war we pursued both a direct and an indirect approach . . . direct by air, and indirect by surface operations. Thus there was a continuous pressure maintained upon our enemy from within and without. In the future the effects of weapons of mass destruction are likely to emphasize this dual pressure in the following ways. First the pressure from within is likely to be much greater, and therefore the degree to which we can rely upon this form of air warfare will also be greater. Second, the pressure which we will be able to exert by surface operations from without may well be much less, owing to the defensive power of weapons of mass destruction in the hands of the enemy. Thus both these factors may well tend to emphasize the direct nature of our strategy. To take this argument a stage further, and discount the influence of the external pressure altogether would probably be going beyond what we can reasonably foresee at the present moment.

Just as continental strategies may involve direct and indirect approaches, and just as maritime strategies may also involve direct and indirect approaches, so also our air strategy may involve direct or indirect approaches. Supposing, for instance, that the enemy's defences proved too strong for us to break through to the heart of his war potential, or supposing his whole industry were made invulnerable, then our air strategy would be confined to breaking down the enemy's air defences as an indirect attack preparing for the direct attack against her industry, or to blockading his communications in order to paralyse his industrial heart, with a view to withering his war potential. Each element has its own characteristics and these impinge upon the conceptions of strategy which may be adopted in respect of it. On land a direct approach by one land power against another produces a trial of strength in battle. At sea a direct attack by one sea power against another produces a naval battle. If a sea power attacks a land power, however, it must inevitably adopt indirect methods to defeat it, and the same applies to a land power when attacking a sea power. The same is true, on the whole, in the air. If an air power attacks another air power, the result is an air battle. The victor and vanquished will be affected by the outcome in proportion to the extent to which they rely upon air power both in defence and offence. It is not open to a country to choose to what extent it will rely upon land or sea power. The decision was made by fundamental factors of which the main one was geography. In the same way the decision as to how much a nation can rely upon air power is also decided by elemental factors. By the all-embracing nature of the air, it is clear that every nation which wishes to survive must be an air power, whatever else it may also be, whether otherwise predominantly sea or land power. This is a basic truth in strategy today.

Service Strategy Today

Hitherto, historical writers on strategy have normally dealt separately with military and naval strategy. Of the many writers it will probably be agreed that Clausewitz and Mahan are the accepted giants in their respective spheres. But even before their time, strategy was a joint matter between the navy and the army. Take, for instance, the Fabian strategy of the Punic wars. He used the seapower of Rome to outflank the landpower of Carthage. Nevertheless, it was simpler in those days, and, indeed, until recently, to divide up the spheres of responsibility between two services working in adjacent rather than coincidental arenas. Moreover, owing to the slow tempo of communications it was not possible for a government to take a hand intimately in the operations of their fighting services, and so the authority of admirals and generals was clearly defined. They were all-powerful in their own spheres, and this was reflected in a more definite conception of the sphere of strategy than would be possible today. Thus the divisions of responsibility were defined horizontally as between arenas (sea and land) of operation, and vertically as between authorities (government and generals).

Two new elements in war may be said to have contributed above others to the elimination of these clear-cut divisions. The first is the speeding-up of communications which in effect brings a government into intimate contact with its representative in the theatre of operations. Thus there may be a greater interchange of information and advice, and indeed many of the means for obtaining information which it might otherwise have been necessary for the commander to take to the battlefield with him, may now be kept in the base area under the eye of government representatives. Thus the vertical definition of responsibilities has tended to become blurred by the possibility of obtaining greater co-ordination between those responsible for war policy and those responsible for conducting service strategy.

The other element which has contributed to the elimination of the clear-cut divisions of responsibility is the rise of air power. There is no operation of war of any magnitude which does not involve the employment in greater or less degree of air power. Since the air covers both land and sea, and since all former types of surface operation can be assisted by the tactical use of air forces, there is an evident need for the integration of plans between the air and sea or air and land forces. In its broadest sense at service level, there is no operation of war today which is not a joint operation, the emphasis being laid on the appropriate element in accordance with the immediate aim of the operation. On the defensive, the air forces may bear the brunt of the fighting, but the navy must assist in the maintenance of supply routes at sea and the army must assist in close defence with anti-aircraft guns and troops on the ground. In the air offensive, the air forces may bear the brunt of the fighting but the navy and the army must continue to do their jobs in maintaining the peripheral pressure. In amphibious operations, we find the three services working together at a tactical level in closely integrated operations at every level and tactical period . . . the preparation, sea approach, assault, break-out and subsequent battles. Thus it is naïve today to speak of this or that service strategy in terms of bygone conceptions. So-called sea, land or air battles differ only in the emphasis to be laid on the techniques of war appropriate to this or that element. All strategy must now be conceived as joint strategy, for any other conception can only take into consideration a segment of the whole. Any attempt to segregate this or that form of warfare by reason of the somewhat arbitrary division of particular services to correspond with particular elements, is to invite battle half-armed, to dispense with the principles of concentration and economy of force, and to reveal a dangerous ignorance of war in our time. Even though the operations of war may be widely apart, some being principally of one element and some of another, they all contribute to a single service strategy. This is particularly true, to take an illustration, of the strategic air attack, the direct approach, and the peripheral operations, the indirect approach, between which two millstones we may seek to grind the enemy.

Reorientation of Our Grand Strategy

We have seen how the geography of an area and the people influence our strategy. We have seen how self-preservation is the motive power behind particular strategies, and how they have been adapted to the geographical situation by the people of a nation. We have seen, in fact, how it is the requirements of self-preservation which have influenced not only our fighting strategy but also our grand strategy—*not* vice versa. This is tantamount to saying that techniques of war have influenced our grand strategy. Thus we have hitherto relied mainly upon sea power, and its implications have influenced our grand strategy to such an extent that we have also been able to refer to our grand strategy as a maritime strategy. We have already seen how the technique of air warfare has adjusted our strategy at service level, and has opened up a channel for direct action against our enemies, which has hitherto been denied to us, and how it has changed the nature of all operations of war. Let us enquire as to how air power should reorientate our thoughts on grand strategy.

First let us consider the overall relationship of sea, land and air power as between ourselves and continental powers. We have seen how we were a smaller nation and had a smaller total of war potential than continental powers, and how we could rely for our security upon sea power, and could therefore concentrate upon its maintenance virtually to the exclusion of land power. Using the imaginary figures as before, we might express this in the following table, showing units of war potential:

	Land	*Sea*	*Total*
Continental Power ..	7	3	10
England	1	5	6

It is clear from this table that England was able to retain command of the sea despite the fact that she was a less powerful nation in overall war potential. She owed her security and her remarkable power to her strategic position.

Now today, whether a power is predominantly a land or sea power, it must also be an air power as well. Thus the war potential of a nation will be split into three. Assuming for the purposes of argument that our total war potential is the same, that is six units, and that of a continental power is ten, then our table might very well look like this:

	Land	*Sea*	*Air*	*Total*
Continental Power	4	2	4	10
England	1	2	3	6

The command of the sea and air is the guarantee of our insularity, and yet we see that under this new line-up of joint air and sea power on which we rely, we are at a disadvantage as compared with a land power—our 2 plus 3 against the enemy's 2 plus 4. Thus our position as a self-reliant colonial power has been gravely weakened by the conquest of the air. These figures may help to indicate also the degree to which our insularity has been impaired. They also indicate what must at all costs be done to compensate for our less favourable strategic position—and this requires some far-reaching reorientation in our grand strategy.

Now let us consider the three categories into which grand strategy falls: political, economic, and fighting power. Formerly our main aim in the political sphere was to ensure that coalitions of sea power could not be brought into being against us. Today, we must see to it that coalitions of air power as well as sea power are not brought about against us. In the past the fundamental influences of geography and dependence upon seaborne trade gave us a great naval advantage over our enemies. This same fundamental advantage does not accrue to us in the case of air power, which is largely a power apart from our peace-time organization. Nevertheless, it is necessary for all countries to be air powers, whatever else—sea or land powers—they may be. In addition, we only came into contact with seaboard nations in the days of our sea power. Today we come into contact with all nations, for the air envelops all the earth. Thus any notions of buffer states will need considerable qualification, for land and sea barriers are no longer final deterrents. What is more, the technical limitations of some of our equipment make it highly desirable that we should have some defence in depth behind which to protect our industries. Thus we may be forced to enter into commitments with nearby continental powers. Since our sea-borne lines of communication are increasingly dependent upon air-mastery over them, if not also for tactical protection, we must ensure that they do not pass through areas which are accessible to enemy air attack. In some cases we may have to gain possession of new bases in order to cover the sea routes from the air. Thus, on all these counts we must reconsider our political attitude towards the nations of the world. No longer can we afford to live in the so-called splendid isolation of the past.

In the economic sphere, we are even more dependent upon sea communications than in the past, but their integrity is now dependent upon air superiority except where they pass through areas which are remote from enemy air attack.

The tactical protection against submarines needs the joint efforts of air and sea forces and therefore bases will be required for them.

Our dependence upon air power is synonymous with our dependence upon a vast and complex industrial organization. Being concentrated, this is very vulnerable, and therefore we must think of dispersing it throughout the Commonwealth. But this is not enough, for it is doubtful whether we could maintain our efforts without the support of a highly developed industrial reservoir, such as the United States of America with her comparatively secure industry. Thus we are economically linked to the United States and have become dependent in great degree upon her for our very security. In this respect, the importance of Ireland as an air base is considerable, as is also the importance of such bases as the Azores, for these are pillars in the security of our Atlantic lines of communication to the industrial heart of western civilization. The needs for special metals in our air industry has given new importance to certain territories in the world, and the requirement for radium needs no comment. The need for encouraging industries such as wireless manufacturers, gramophone companies, furniture makers, car manufacturers and such firms to form a reserve of aircraft industry is evident. Thus in the management of our economy, air power has introduced many reorientations which must be made to ensure that our war potential is developed as far as peace time will allow, and is rendered secure against enemy air power.

We have dealt with the influences of the new techniques of war upon our fighting potential in defence and offence. However, it may also be said that not only have all operations of war suffered a radical change, not only are we committed to a strategy mainly of direct approach, but we have before us a comparatively new form of warfare. This will involve thorough intelligence of the enemy's economy to allow us to select the critical bottlenecks or weak links in his organization, so that our air attacks may bear the best fruit. The preponderant effort in war is likely to be required in support of the direct attack, not, however, without regard to the need for the indirect approach by which the enemy's fighting potential may be extended, contained and withered at the fringe, also disembowelled at the centre. Such plans should be co-ordinated so that peripheral operations will open up new opportunities for the direct attack to increase its effect by bringing more targets within range, or by shortening the distances to them, by forcing the enemy to fight on two fronts, by splitting his defensive organization, denying him adequate depth for his defences and so forth.

There is, therefore, a wide range of reorientations which influence our grand strategy in all spheres: political, economic, and in fighting potential. It is no longer possible to talk of our strategy as a maritime strategy in the exclusive sense which has pertained through history. The influences at work are diverse, and the techniques of war which guarantee our security are complex. All facets of the nation's economic and fighting potential are required to ensure the security of this country.

Terminology in Strategy Today

We have reviewed the levels of strategy considered to be appropriate by historical writers on war before the twentieth century. Without attempting to be too specific, but rather by way of suggesting some slight reorientation which, had they still been alive, these same writers might very well have adopted in the light of modern techniques of war, it is proposed that the following definitions should be accepted in our thoughts on strategy:

A *Level*	B *Type of Strategy*	C *Past Character*	D *Present Character*
Government	War Policy or Grand Strategy	Maritime S.	National S. (Commonwealth or Allied as appropriate).
Service	Strategy	Naval S. Military S.	Joint S. (i) J. War S. (C.O.S. level). (ii) J. Theatre S. (Theatre level).

There is no major change in the functions of government in time of war, although it is very much more in touch with the theatre campaigns in progress. On the other hand, there is a considerable difference in the central direction of the war. The war strategy, as distinct from government war policy, is studied and controlled under a Minister of Defence with the assistance of the Chiefs of Staff Committee. Here, and here alone, can the joint strategy of the war as a whole be kept under review and married to our fighting potential. It forms a bridge between grand and service strategy as conceived in the past. Below this close integration between government and service strategy are the theatres in which operations are being conducted. At theatre level also the strategy adopted will necessarily be a joint strategy. Its planning and co-ordination will fall within the broader plans of the overall war strategy. It is true that beneath this there will be the several services, each employing its own techniques of war. Owing to the complexity of modern operations, however, and the essentially joint nature of almost every phase of operations in some respect or another, any single service preparations or operations can hardly fall within the definition of strategy—"the use of the prepared means to achieve the aim in war"—for a single service cannot achieve the aim alone. Thus theatre strategy is the lowest level at which it is reasonable to speak of strategy in modern war.

Conclusion

My aim has been to give definition and value to the terms and ideas which are contained in our thoughts on strategy at its various levels, and to see whether traditional ideas should now be modified in any important respects. The influence of modern techniques of war upon service strategy—which I have called joint strategy—has been reviewed to establish the nature of the changes which have taken place. As an incidental matter it has been shown how service strategy may now be subdivided into joint war strategy and joint theatre strategy, and it is contended that these are valid and helpful definitions.

The influence of modern methods of war upon our security, which is the starting point of all conceptions of strategy whether at service or government level has been reviewed. At the latter level of grand strategy we have indicated the nature of the changes which have been brought about in the political, economic and service spheres of the nation's policies. And these modifications have altered in varying degree all the policies of this country.

Moreover, it can be appreciated how particular terms may lead to confusion of thought unless we have a very clear grasp of the factors underlying them. Terms of general application to particular conceptions of strategy must be altered if the emphasis upon factors from which they derive their definition has been altered by new techniques of war. It is clear that the term "maritime" can no longer be applied as a generic term to embrace our grand strategy without considerable qualification. Therefore, it has been suggested that it should be discarded, and that, if any term is required to replace it, this might be a quantitative rather than a qualitative term, *e.g.*, "national, commonwealth or allied strategy." Even if this term does no more than eliminate the confusion which is likely to arise from any more specific reference to this or that element, it will be useful to indicate the essential unity which underlies all strategy at all levels. For it is of fundamental importance in the formulation of any strategic conception today that this unity should be understood.

The conquest of the air has introduced new strategic factors which have now welded our past conceptions of strategy into one indivisible scheme of war. Techniques of war, once divisible into sea war and land war, are now brought together in the midst of the air ocean. Service strategy, once divisible into two dimensions—naval and military—is now three-dimensional and welded together within the span of the air ocean into a single unity. Our grand strategy by which we seek at the highest level to combine all our energies—political, economic and fighting—to achieve the security and prosperity of our nation and commonwealth is correspondingly influenced by these new factors. They have modified the strategic effects of our geographical position as an island; they have affected our economic situation as an industrial power; they have radically altered the warlike methods by which we guarantee the security of our base and our lines of communication on the surface, and our methods of imposing our will upon the enemy. The over-riding problem of commanding the air ocean conditions our command of the sea and land surface in the same sense as once the problem of commanding the sea conditioned for us the command of our living space and our sources of wealth. Thus, the first aim of all our forces in war must be to command that air ocean as we once sought to command the sea. The political and economic facets of our grand strategy must be directed accordingly.

The R.A.F. Task Force, Malaya

THE FIRST TWO MONTHS

MAY of 1948 saw the Royal Air Force, owing to the need for administrative economy of force, leave Kuala Lumpur, the capital of Malaya.

Two months later the Royal Air Force returned to the airfield as the R.A.F. Task Force, Malaya. In that short period the political situation of the country had changed to an almost unbelievable extent. In May, in spite of some industrial unrest, the country was peacefully producing the pounds of rubber and the tons of tin that were bringing in a large number of much-needed American dollars. Law and order still prevailed throughout the land.

But by July the situation had altered gravely. Murder, violence and stark terror were now rampant. Armed Communist forces had come into the open. Suddenly they attacked remote or isolated plantations, killing without exception all the European staff who fell into their clutches, firing the smokehouses where were stored the stocks of processed rubber ready for shipment overseas, and then disappearing into the fastness of the dense Malayan jungle. In many areas, both by day and by night, they callously murdered their compatriots, whose only crime lay in not offering allegiance to Communist theories or in refusing to fulfil extortionate demands made on them for money or food. The lives of rich and poor, of young and old, were no longer safe. The law of gun and knife was overshadowing this pleasant land.

To meet this situation the armed forces were called out on 28th June to the aid of the Civil power, and by 4th July the R.A.F. Task Force, Malaya, consisting of a squadron of Dakotas and a squadron of Spitfires, had concentrated at the Kuala Lumpur airfield to operate against these extremists. This Task Force was under the direction of Air Vice-Marshal A. C. Sanderson, the A.O.C. Malaya who had set up a Combined Headquarters with the local Army Commander. With the squadrons also came Spitfires from Far East Photographic Reconnaissance Squadron. From high altitudes with their powerful cameras they would take the photos which alone could detect the dried palm-leaf roofed huts, hidden away—like needles in a haystack—amidst the many square miles of tropical vegetation, where the bandits had established their camps, headquarters and hideouts.

Peaceful Kuala Lumpur airfield began to resume its appearance of three years before. Flight tents and servicing tents gradually made their appearance on the airfield one by one. An Operations Room, with Signals Section, Intelligence Offices and Briefing Rooms, came into being. A mobile photographic trailer, with all its paraphernalia, appeared one day and started immediately into action. A flight of the R.A.F. Regiment (Malaya) with its Malay airmen marched in and took over the defence of the airfield, in which they were assisted by a number of R.A.F. Police dogs and their handlers. M.T. bearing the R.A.F. roundel moved hither and thither along the roads of the camp site. Bronze-bodied airmen, wearing only shorts, socks and shoes, were to be seen working in their flights or sections.

Dilapidated buildings—in varying degree, became kitchens, dining halls, messes, sleeping quarters, equipment stores, sick quarters, orderly room and the like.

Everyone, officers and airmen alike, readily accepting their novel and at times irksome conditions, set to with a heart and a will to prepare for the coming operations.

Whenever information came to hand from local sources that a bandit force was thought to be in occupation of a certain area of jungle, or in hiding in a hut or habitation in the centre of a swamp, first a reconnaissance aircraft would fly over the suspected spot to take photographs. In order to allay suspicion this aircraft was forbidden to circle in the near neighbourhood of its target but was directed to fly over in a direct line to give the impression of being engaged on a routine flight. Confirmation of the bandits' existence having been thus obtained the Spitfire pilots went in and struck. If the target was in an isolated part of the country or difficult of approach their action was independent of the other services. A typical target of this kind was a hut in a clearing in the centre of a large tract of swamp not easily accessible except by boat in a lonely part of the State of Perak, where bandit leaders were known to hold meetings. On 21st July, Spitfires attacked this meeting-place in the early morning with rockets, cannon and machine-gun fire, achieving complete surprise. A subsequent search party reported that underneath the debris of the burnt-out building were found the bodies of ten armed men.

Strikes were not the only "offensive" contribution that the Spitfires were making in these operations. In the southern part of the Northern States of Kelantan, one of the most wild and rugged districts in Malaya, the bandits had captured, in July, an important Police Post and their force had established themselves in its neighbourhood.

Thereupon a combined Gurkha and Police Force were despatched to dislodge these newcomers from this stronghold. Half-way from their objective this force met with determined resistance which was overcome by the assistance of Spitfires at "cab rank" giving aerial support whenever called upon.

In August the strength and capacity of these attacks was stepped up by the advent of Beaufighters who, with their greater load-carrying capacity and increased radius of action, were a welcome addition to the operations.

Two days after their arrival together with Spitfires they made their first strike in South-East Perak, wrecking a bandit hide-out consisting of several dispersed huts located in flat marshy ground, some of which, on being hit, exploded with considerable violence, hurling debris high into the air, and giving the impression that an ammunition dump had been hit.

During the day the bandits either maintained a disguise by following their normal calling in the industrial and agricultural life of the country, or were lying up in their secret hideouts, and the more important meetings of the leaders were generally held during the hours of darkness. It was felt that, could such meeting-places be struck when they were occupied, not only would appreciable damage be caused to the movement as a whole, but a lowering of morale could also be confidently expected amongst its members.

The first attack by night by Beaufighters took place during the moonlight night of 23rd August, when the target was a known bandit meeting-place secreted in the depths of a thick area of jungle not far from the important tin mining centre of Ipoh. The target was easily located by the Beaufighters and attacked accurately with bombs, rockets and cannon fire.

These strikes were all witnessed or heard by a large number of people of all kinds and had the effect of encouraging the law-abiding citizen and discouraging the bandits or gangster elements.

PHOTOGRAPHIC RECONNAISSANCE AND SUPPLIES BY AIR

While the exploits of the rocket-firing Spitfirers and Beaufighters were receiving prominence in the World Press, due to the "Headline" nature of their strikes, Dakotas and P.R. Spitfires were less spectacularly playing an equally important role in these operations.

Since its arrival in Kuala Lumpur the Dakota Squadron had little or no respite given it, due to the many and varied demands made on the aircrew and their aircraft.

Since early July the work of the Squadron consisted mostly of reconnaissance, reinforcement and supply, or message-dropping flights. On many occasions single sorties, some of over eight hours' duration, have involved a combination of these tasks.

The Federation of Malaya covers many thousands of square miles, the greater proportion of which is dense jungle and swamp with few well-surfaced roads. Under such conditions an independent force moving through country of this nature, if required to operate for some time, will find its movements seriously cramped and restricted by the need for replenishment of supplies and establishment of a line of communication with its base. Progress will always be slow and often difficult, but with natural dropping zones and a force of aircraft to drop essential supplies, problems of maintenance obviously become greatly simplified.

Great accuracy is required for the successful dropping of these supplies, as the dropping zone may well be only a small clearing in the midst of virgin jungle, or in a narrow valley beside a stream.

At one important Police Post in the heart of Malaya the only suitable dropping zone is to be found alongside a towering limestone formation rising sheer out of the jungle—a common feature in that part of the country. In order to drop their supplies within the zones, the Dakota pilots have to make their "runs in" parallel to this formation, the wings of the aircraft almost touching the cliff walls with its peak towering above them.

Over forty of these drops have been made in one or other part of the peninsula in the past two months, which gives an average of two drops every three days.

Another variation of this type of air operation has been the widespread dropping of millions of leaflets throughout the country. Printed in English, Chinese, Tamil and Malay, these leaflets call on the native inhabitants to remain loyal and not to be intimidated by Communist agents or propaganda. To date, six million leaflets, one-third of the total number prepared, have been dropped over Chinese villages, Malayan kampongs, rubber plantations and tin mines.

In view of the difficulties of speedy ground communication, the air-lifting of Police and Army reinforcements, together with guns and ammunition, has been another constant task, and in the earlier days was of especial importance.

Last but not least in importance of the tasks allotted to Dakotas in this campaign have been low-level photographic reconnaissances over the heavily wooded mountainous ranges of the Siamese border.

In some parts of the border the density of the forest has to be seen to be believed. Viewed from the air even at low level it can best but quite inadequately be described as an enormous sea of green—comprising every shade and distinction of that colour—apparently rising and falling with the contours of the land beneath, none of which is discernible to the eyes. Indeed the trees are packed so close together that there would seem no room for man or beast to pass between. Of prominent landmarks there is seldom, if ever, the vestige of a sign.

It is in these regions that the bandits are most likely to have established bases; it is here that unceasing vigilance and observation are more especially called for.

As soon as operations got under way, immediately there was request after request both from the Army and Police Porce that this particular area of forest or that particular piece of jungle swamp should be covered. It is on record that in spite of seasonal atmospheric conditions during these two months, every day at least one sortie was flown and completed, and during the whole period over one hundred were made.

It is revealing how many bandit camps and headquarters have come to light by these photographs, though their leaders were making every effort to screen their haunts from overhead observation, in which the Malayan jungle with a wealth of natural cover aided them.

Flying this type of reconnaissance varies distinctly from the technique obtaining in other parts of the world. This is partly due to the maps of Malaya not possessing sufficient detail, due to the constantly changing face of the countryside. A landslide after a heavy rainfall may change the course of a river or stream, enterprising local inhabitants will rapidly effect a clearing in a forest area and, similarly, a deserted clearing will soon revert to its original jungle. Consequently pin-pointing is always a matter of some difficulty.

Weather in this part of South-East Asia, of course, plays a very important part—if it is not the deciding factor in aerial photography. If the area to be photographed is covered by cloud for more than a third of its extent, it is both a waste of time on the part of the pilot and of flying hours to pursue the task further, as so much of the detail will be missed out.

While it is one thing to take photographs in the air, it is another for the air film to be properly processed after the Spitfire has landed. Even as the vagaries of the Malayan climate affect flying, so on the ground does an average day temperature of ninety degrees plus a high rate of humidity affect the developing and fixing of film which has to be carried out in the somewhat cramped quarters of a mobile photographic trailer. All-night shifts are worked as far as possible to avoid the heat of the day.

Again, when it is remembered that each sortie means up to 250 exposures and that each print at some stage requires individual attention, especially in the captioning and numbering, some idea will be gained of the work involved, more especially when it is added that it is the exception rather than the rule for only one sortie to be flown daily. Already under these irksome conditions over seven thousand prints have been produced and the number is rapidly increasing as are the demands for P.R. cover.

"SHOWING THE FLAG"

A further task on which nearly all the aircraft of the Task Force have been employed at one time or another is one that might be termed, for want of a better word, "showing the flag" flights.

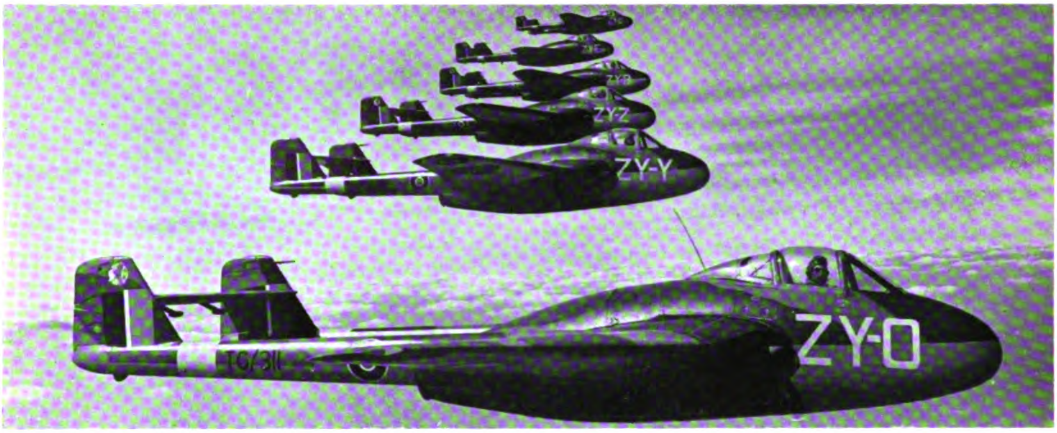
Along the eastern and western seaboards, and dotted over the more habitable parts of the peninsula, there are many estates, mines, small townships and similar communities whose inhabitants, on account of distance and poor communications, and, possibly, also by inclination, lead somewhat secluded and self-contained lives. At the moment, under present conditions, many of these people are living under some measure of nervous strain, with a doubt in their minds as to the security of their families, their responsibilities, and themselves. To reassure them that their safety and that of their dependants is never forgotten, that in reserve are the armed forces who will come to their assistance whenever required, and to give them tangible evidence of that fact, aircraft flying at low level at frequent intervals pass over their homes, offices and estates, an outward and visible sign

[Photo by courtesy of The Malayan Agency

TYPICAL MALAYAN COUNTRY

THREE ESSENTIALS AT OUTBREAK OF WAR

(Prize Essay by Squadron Leader J. M. S. Ross)



1. COMMAND OF THE AIR

2. COMMAND OF THE SEAS

3. ADEQUATE SUPPLIES OF MUNITIONS OF WAR

Face page 89

of the presence and strength of the forces of law and order.

There is no remote area of this kind in the peninsula which has not been thus visited by the aircraft of the Task Force, and to the people who watch their swift passage from below they come as a message of comfort and heartening cheer in these days of difficulty.

In this manner has the R.A.F. Task Force become a complete, fully fledged, self-contained, operational Force, a source of fear to the Communist bandits and a bulwark and shield to all those that oppose them.

It has given a good account of itself in the first two months of its existence, which it hopes to uphold during the months to come until there is no further need for its services and peace has returned to Malaya.

CASUALTIES IN MALAYA TO DATE

Police and Military.—Killed, 222; wounded, 263.

Civilians.—Killed, 397; wounded, 220; missing, 98.

Bandits.—Killed, 510; wounded and escaped, 65; captured, 349.

Death sentence carried out under E.R.—35.

Prize Essay

BY SQUADRON LEADER J. M. S. ROSS, R.N.Z.A.F.

"If war cannot be abolished, the direction of our national resources and inventive genius to the needs of military air power would give us the greatest chance of victory."

THE ability to discuss the above statement intelligently would appear to depend upon an accurate knowledge of the nature of our national resources and inventive genius, a high degree of familiarity with the requirements of over-all strategy and considerable acumen on the part of the writer. The author of the present essay trusts that he is not violating the rules by giving too broad a clue to his identity in confessing that he enjoys none of those attributes. However, consideration of the subject gives rise to certain thoughts, the setting down of which provides mental exercise and a welcome relaxation from the rigours of post-war life.

The supposition that war cannot be abolished is, for all practical purposes at present, valid. Strife within a given set of territories can be eliminated provided they are ruled by a single sovereign power which has at its disposal sufficient armed force to quell any internal conflict, as was the case in the Roman Empire. Provided that the racial elements and economic interests are not too diverse, nations may, after the course of centuries of enforced living under one rule, coalesce and regard themselves as a single people; as has occurred to a certain extent in the United Kingdom, where the Scots, the Enlish and the Welsh live in almost complete amity side by side. In this instance, fusion has been facilitated by racial characteristics. The Scots, who have a highly developed sense of humour, enjoy making a financial profit out of their southern neighbours. The English, who regard Scotland as part of England by virtue of conquest, do not realize that they are being exploited and are quite content with the Union.

It is possible, but not probable, that a time will come when one Power will be in a position to impose its will on all the peoples of the world and force them to live together in brotherly love and peace. If such a state of affairs were to come about it is unlikely that it would endure for long, for armed force is only one of the factors necessary to ensure peace. There must also be a community of interests, economic prosperity and contentment. Otherwise, peoples will first revolt against the over-riding Power and then revert to their present state of international anarchy. Recent events in India and Pakistan illustrate what happens when two peoples are released from the restraints of a superior authority. The aspirations and the needs of the peoples of the world are so varied, and racial prejudices so deep-rooted, that it is extremely unlikely that the time will ever come when they will all voluntarily live in a state of peace in which there is no thought of recourse to conflict.

At the present time the threat of war looms almost as darkly as it did nine years ago, although economically there is less reason for it. In 1939 Germany was probably justified, from her own point of view, in demanding Lebensraum and in resorting to force in an attempt to obtain it. Today, none of the three Powers capable of waging a major war is in need of more territory. Each controls a large proportion of the world's land area and of its raw materials. From 1939 to 1945, while the Allies were fighting for their way of life, the aims of the enemy in making war were mainly economic. The indications are that if another world war breaks out within the next generation it will be fought by both sides on an ideological issue — Democracy versus Totalitarianism.

Of the three Great Powers, Britain is least likely to initiate a third world war. Her vital in her position as a debtor nation and to develop need is a period in which to reorientate herself in the Empire the projects which it is hoped will provide her with an adequate food supply. That being the case, it is safe to assume for the purpose of this essay that her warlike preparations will be designed with a view to the defence of the Empire, not to an attack on a foreign country. Nevertheless, if war does become inevitable, it would possibly be an advantage if, for a change, Britain were able to strike the first blow, and the desirability of this should be considered in any plan of defence.

The initial stages of the recent war were characterized by two things for which the Allies were unprepared: the blitzkreig and the activities of the Fifth Column. Unsafe as it is to predict the future from the past, it is probable that they will feature again at the beginning of another war. The initial attack will almost certainly be airborne, consisting of bombardment by heavy bombers or guided missiles, or both. If the enemy can gain command of the air, airborne landings may follow shortly after. Before this there will have been a considerable period of preparation within Britain itself, during which an attempt will have been made to weaken the country internally by subversive propaganda and preparations for sabotage. Furthermore, the possibility of a bacteriological campaign immediately before the commencement of hostilities should be borne in mind. If Britain could be immobilized by a widespread general strike, and if at the same time a large proportion of the population were suffering from whooping cough when an attack came, she would be under a serious handicap.

If war comes again it will probably come suddenly. Britain will need sufficient strength to meet the first onslaught while she mobilizes her full resources; and she will need to develop her full strength quickly. For the past four hundred years she has been able to minimize the danger of overwhelming attack by preserving a delicate balance of power in Europe. She is no longer able to do this because the world powers of today are too few and too great for anything like delicacy of balance to be achieved. Furthermore, recent experience has shown that it is not desirable to pin much faith in allies. Some prove to be broken reeds, others refrain from joining in the fight until it is almost too late. Therefore it will be necessary for her to be prepared to stand alone in face of aggression, at all events for a period. Any country which is not able to do that has little chance of survival.

It is suggested in the title of this essay that the best way of preparing to meet the initial shock and to achieve final victory is to concentrate our energies primarily on the development of air power. If there were no problems of finance, production and manpower with which to contend there would be little point in discussing the matter at all. Britain with a strong and constantly up-to-date air force stationed both at home and throughout the Commonwealth would be in a position both to defend herself against attack and to retaliate immediately. It is doubtful whether any other nation would take the risk of attacking her.

Unfortunately Britain's resources have never been less adequate in relation to her needs than they are at the present time. It is therefore necessary to consider whether the protagonists of air power are justified in claiming a lion's share of what is available at the expense of the Navy, the Army and the needs of civil reconstruction. Granted that the country cannot afford to make itself impregnable, will research into and development of air power give a better return than any other form of activity? All branches of the armed forces are complementary, and all are dependent upon the civilian workers at home. No nation in modern times has won a war without using its army, and no British army can leave the country without being transported and escorted by the Navy. Both Army and Navy are essential for final victory, and both for the defence of Britain if she is attacked. Furthermore, unless the Navy is available to guarantee the arrival of food convoys, Britain must starve. There would be a good case for claiming that a large proportion of current research and production should be directed towards naval problems. If atomic bombs are to be used against us, it will obviously be uneconomical to have ships bunched together in convoys, and if they are to sail singly a lot more thought will be needed on the subject of anti-submarine protection. Alternatively, it may be necessary to consider developing the freight-carrying submarine.

As stated above, however, the prime necessity is to be able to withstand the initial attack and to strike back immediately at the bases from which it was launched. For this, the development of air power is essential. Without adequate fighter cover, Britain is vulnerable to enemy forces of aerial bombardment and eventually to airborne and possibly surface landings; and without long-range bombing forces, which include guided missiles, she may be beaten to her knees without being able to strike back. Recent history has shown that without air support, surface forces are powerless against an enemy which has it, as was the case with our army in Greece. Moreover, the reduction of Rabaul in the South-West Pacific by the American and Dominion air forces demonstrated that although air power alone cannot conquer territory it can completely neutralize the strongest bases. On a larger scale, it was the strategic bombing of Germany which reduced its strength sufficiently to enable the invasion of Europe to take place. In short, although so far as can be seen wars in the future will not be finally won without military and naval forces, they will certainly be lost without adequate air strength right from the start.

Reference has been made above to the dependence of the armed forces on the civilian workers at home, and to the fact that these may be subjected to alien propaganda for some time before war breaks out. This must be remembered when defence needs are being considered. There are already strong subversive elements in all the democratic countries of the world, and they flourish most where there is economic hardship. If they succeed in causing a considerable proportion of the population to become discontented, the people as a whole will not be behind the war effort, and the armed forces may well be hamstrung. The Germans in the years preceding the late war lived hard in an effort to build up their military strength, and were forced by continuous propaganda and an efficient secret police to do so without complaining. Britain at present suffers from a lower standard of living than did the Germans of those days, and it must be raised if the people are to have the moral and physical stamina to face another war. Therefore for some years to come the needs of the armed forces must be finely balanced against those of the civil population.

To sum up: there is no reason to suppose that war can be abolished; if Britain is to survive another conflict she must from the outset be strong in the air; her navy must be in a position to ensure the arrival of supplies from overseas; her army must be capable of rapid mobilization for service at home or abroad; and her civil population must be united behind the fighting services. All these factors are vital for victory, but without air superiority the others are useless. Therefore it is essential that the development of military air power should be given first priority in the employment of the brains and productive power of the country. Guns before butter, perhaps; but air power before either.

The Joint Services Staff College

WAR and strategy have ceased to be the business of any one Service operating in a single element. There are air operations, land/air operations, sea/air operations and combined operations involving all three elements. All demand in one degree or another the exact co-ordination of the techniques of war and their appropriate weapons in the three elements. In fact, the division of Services by elements has become increasingly a matter of administrative convenience. What cannot be allowed is a resurgence of those obstructive antipathies between the various branches of the fighting Services which blotted the escutcheon of our otherwise magnificent will to fight in the early days of the last war. They were the gospels of anarchy and ignorance.

Not only must we achieve that precise co-ordination from which we can make the best use of all our fighting potential, but today we are faced on a grander scale than ever before with the problems of co-ordinating the resources of our own great Commonwealth of Nations, the nations of Western Union and the powers which are being brought together under the Atlantic Pact. If we are to avoid the confusion of Babel, we must ensure a common basis of understanding in our deliberations, a cohesive organization and the best arrangements for the pooling of our vast resources. Our western civilization and the security of perhaps many generations hereafter depends upon it.

In 1941 a young Air Force officer was invited to address the Army Staff College at Haifa. He remarked upon the manifest absurdity of a single Service institution for the study of war when no operation was not at least a two-Service and very often a three-Service problem. The Commander-in-Chief took up the sentiment and there has since been a growing consciousness of the pressing need for the integration of Service training and doctrine. After the war Viscount Cunningham, the Naval member of the Chiefs of Staff Committee, proposed that a joint Services Staff College should be established. With the approval of the Chiefs of Staff, Admiral Douglas-Pennant was appointed the first Commandant of the Joint Services Staff College, and asked to prepare his own directive.

The Charter of the J.S.S.C. as confirmed by the Chiefs of Staff is:

> ". . . to train officers who are already qualified in the staff work of their own Service, for staff appointments in joint staffs, and in so doing to improve their qualifications for higher staff appointments in their own Services; to develop mutual understanding and a common doctrine between Services, and to evolve a standardized system of staff work."

Attention is focused upon principles and higher staff work rather than upon details. The syllabus of instruction includes the study of:

(*a*) The organization and capabilities of the three Services, their relationships with each other and with the other Government Departments.

(*b*) The planning and execution of all types of joint operations with special reference to the administrative aspects.

(*c*) The broad administrative aspects of joint operations of all types.

(*d*) Imperial strategy, including the governmental machinery for the central direction of war, the system of higher command and co-operation with the Commonwealth countries and the United States.

(*e*) The broad problems of war production, modern production methods, economics and allocation of manpower and their relation to the Fighting Services.

(*f*) The influence of scientific progress upon strategy and tactics.

The course lasts for some six months and caters for a total of just under 100 students drawn from all Services of the United Kingdom and Commonwealth Forces and from the Civil Service.

The J.S.S.C., like the Imperial Defence College, is under the Ministry of Defence. The Commandant is of Rear-Admiral, Major-General or Air Vice-Marshal rank, and the intention is that the appointment will be held in rotation by a member of each Service. There are three senior members of the Directing Staff—a Naval Captain, a Colonel and a Group Captain. Beneath these there are five Directing Staff members from each Service of Commander, Lieut.-Colonel and Wing Commander rank. The latter form five Directing Staff joint teams for the preparation and conduct of exercises and schemes. Each of these officers is also responsible for the work of a syndicate of some seven or eight students of all categories.

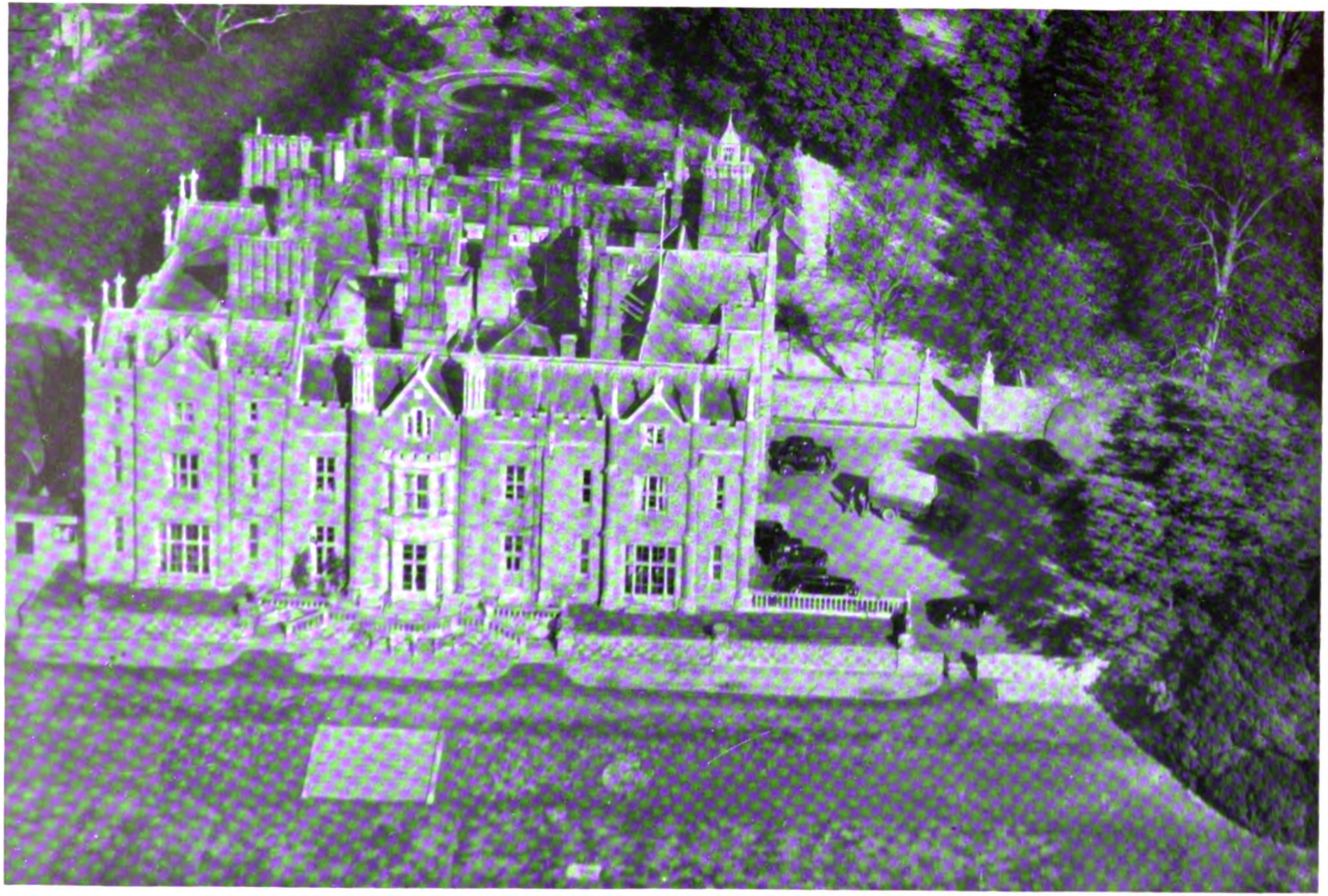
Methods of studying the problems of war vary from lectures to demonstrations, discussions, written exercises, plays, films, visits and private study. Each subject is studied jointly and there is a frank determination to get to the bottom of all problems. Prejudice and the blind acceptance of Service shibboleths soon wither. On the other hand it is in no way the intention to make officers of one Service interchangeable with those of another.

It is a College through which all serious aspirants to high staff and command appointments should undoubtedly pass. To some extent the representatives of each Service are on show to each other, and for this reason amongst the many others, it is extremely important that the best possible candidates should be selected.

The badge of the College bears a cormorant representing the joint ability of the three Services to operate on land and sea and in the air. The motto is "Unity is Strength."

A DEMONSTRATION IN THE MODEL ROOM

Face page 92



THE JOINT SERVICES STAFF COLLEGE, LATIMER

Face page 93

Atlantis and Bogota

By J. M. Spaight, C.B., C.B.E.

THE surface of the earth took its present form, according to one theory, because parts of the primeval continents were shifted by the rotation of the planet and "wandered" from the parent massif or, according to another, because old continents were submerged and new ones arose from a sea which became deep or shallow under climatic changes. Both processes represent more or less what is happening today in the international world. A great land mass is moving westward. A barrier to its progress is appearing from the sea. Atlantis is re-emerging from the ocean, to meet the challenge from the east.

The Atlantic Pact will be the answer of the west to the Russian *Drang nach Westen*. It will be based, according to common report, on the Rio Treaty of September, 1947, and the Brussels Treaty of March, 1948. Well and good; but something more will have to be added if it is to meet the most immediate danger which threatens western civilization.

Both Rio and Brussels are defensive alliances contemplating shooting war. They provide for the rendering of aid by all parties to the treaty to any party who is the victim of aggression. The aid is automatic if an armed attack occurs within a zone indicated in each treaty; in the Rio Treaty it is, broadly, the western hemisphere, in the Brussels Treaty it is Europe. Outside these zones aggression, or threat of aggression, is to be the subject of consultation between the States, who will decide upon the measures necessary to meet it.

An Atlantic Pact based on the two treaties would deal, consequently, with only one of the two kinds of war which have, unfortunately, to be considered today. It would not deal with the cold war, which may be as damaging in its consequences as shooting war. It is common knowledge that the western democracies are re-arming against a possible attack by Russia, and it is such a possibility that the proposed Pact will envisage. It is essential, however, that the other, the non-shooting and more insidious form of aggression should also be organized against, and for guidance here we must go not to Rio or Brussels but to Bogota.

At Bogota in April, 1948, the twenty-one American Republics approved a "Charter of the Organization of American States" and certain other conventions, and also resolutions, of which one only is in question here. This resolution was a corollary or expansion of Article 15 of the "Charter" referred to, stating that no State had a right to interfere directly or indirectly in the internal or external affairs of any other State, and that this prohibition applied not only to the use of armed force but to "any form of interference or attempted threat against the personality of the State or against its political, economic or cultural elements." In the resolution the Republics agreed to certain principles of action for the defence of American democracy. They condemned the methods of any social system which suppresses political rights and freedoms, particularly those methods used by international Communism or any totalitarian system. They agreed to take all constitutional measures to prevent and eliminate activities directed, assisted or instigated by foreign governments, organizations and individuals which might tend to subvert democracy in America. They undertook to exchange information about such activities within their respective territories.

The resolution, it will be seen, provided for co-ordinated action against attempts to wage cold war. Shooting war was dealt with at Bogota only in so far as the Rio Treaty was incorporated by reference in the "Charter of Organization" (Articles 24 and 25). It represents, probably, the limit to which the prevention of ideological invasion can be carried without danger to the democratic freedom which it is the purpose of the resolution to safeguard. But within that limit it is a right and necessary provision. It does not make matters all right, but it makes them better.

A line of defence is no stronger than its weakest part. There will be a weak spot or two in the projected Atlantic Pact. The most elaborate organization of military defence is of little worth if it is liable to be broken not only by direct assault in front but by sabotage in the rear. The whole alliance would be let down if there were some unsound planks in the stockade. There is a danger from within to be guarded against as well as that from without. The allied planners of defence would be blind indeed if they did not see that. They are entitled and, indeed, bound to inquire whether each party to the treaty has safeguarded his home front against the possibility of the treachery that would mean disaster for all. There can be no Plevna to hold the Russians on the Rhine if the men behind refuse to pass the ammunition.

But caution is needed. To go too fast and too far in organizing an international campaign against Communism would be to repeat the error of the Holy Alliance. Indeed, the situation after 1815 was curiously similar to that of the present time. Then also two dangers to law and order in Europe were recognized. One was external aggression, especially on the part of a resurgent France. The other was internal revolution fomented by the Jacobinists; Jacobinism was as dangerous a menace in the eyes of the statesmen of that day as Communism is now. It was the chief bugbear of the autocratic rulers of Russia, Prussia and Austria. First Castlereagh then Canning tried to restrain their ardour to crush it wherever it showed its head. Finally we broke step with our former allies, while they marched on, to interfere in the internal affairs of Naples and Spain. Historical situations recur, of a truth. There is a warning for us in the events of that time.

There would be much to be gained, however, and little to be lost, if the Atlantic Pact were supplemented by an undertaking on the lines of the Bogota resolution. It might go some way towards checking the Russians' design to make the world safe for Marxists. They might achieve their aim without war, by ideological penetration leading to political upheaval and the installation of administrations favourable to their philosophy of minority rule, or, if that failed, by war preceded by a sapping of the morale in each State marked down for conversion. A war won by the Red legions would be an empty victory so long as the United States and Britain retained the mastery of the sea and the air. But the plotters of Moscow might not see that and might try the great gamble of war. They would try it the more readily, the more freely, had they been allowed to organize their Fifth Columns in the democratic countries, whose decadence and softness would thus be demonstrated. They would know, too, that when war did come they would have in each enemy State a devoted band of helpers who could be relied upon to hamper the country's war effort in all possible ways. Some of these gentry would find themselves placed under lock and key, no doubt, as soon as war began, but many would probably remain undetected until they had done their assigned work. They would be at best a nuisance, at worst a danger. That is why the decision of the trade union leaders to purge their executive organs of Communist influence has a real and direct bearing on national defence. For the same reason it is of importance that the Governments of the democratic countries should show themselves prepared to be no less tough in the cold than in the shooting war, for the one is really a part of the other. They will be adequately safeguarded in the shooting war when the Atlantic Pact is in operation, but only if (for the reasons given above) they have taken care to organize their defence against the other kind of war as well. If the cold war showed signs of "hotting up," as it has in the past few months at Berlin, economic constraints such as the interruption of trade relations, would be an additional inducement to the Russians to try to display a little horse-sense, or even—who knows?—to behave at long last like normal human beings.

A Testing Time—and a Time for Test

By B. J. Hurren

THE public prints, not at all as inaccurate or sensational as some jejune politicians would have us think, have put out statements which support the main tenor of arguments produced in the House of Lords: arguments which add up to the phrase "There is something wrong with the Royal Air Force."

This campaign, with its supporting evidence, is no more (to the experienced student) than a mild suppuration of an old wen. Two years ago the theme was that the R.A.F. was finished as a fighting Service, and would degenerate into a monster Transport Command with a highly eclectic, long-haired, slide-rulered body of push-button warfare experts.

A year ago, the theme was that the equipment of the Air Force must be scrapped overnight to make way for the new jet era aircraft. In parallel, the lamps of the Air Force which shone so brightly in war were allowed to burn low under the misguided idea that peace was abroad in the world.

These ideas, gobbled up by the bird-brained and veneered with a philosophy that the world is not ready to accept, were pursued with a lack of clarity of thought that is positively astounding: even to those acquainted with the appalling state of education in England, where the vital quality—the teaching of the ability to think for oneself—has long since disappeared from any curriculum.

Now, the salient point of the matter is that whereas in 1939 (and still more so in 1914) Great Britain had in her own power the decision as to whether to act independently or not, in 1949 the power of decision rests elsewhere. It is a brutal fact: but we are hopelessly and irredeemably committed to a second place as a fighting force unless—as so often has happened—a new technical factor is introduced by British technicians and scientists. Such an intervention by the gods was radar, and none can say what might next save us. Equally, none can deny that under present weapons Great Britain must take a back seat, if perhaps only temporarily.

Therefore, except by the wildest folly of a war with U.S.A., it is expedient to see ourselves, and especially our Air Forces, through a pair of American spectacles.

Let us admit there have been Doubting Thomases who have questioned whether there will always be an Air Force or not; but let us immediately acknowledge that the Americans have no shadow of doubt that there will be. Therefore, unless we are to fall into the trap of the recent war whereby we built virtually no transport aircraft whilst the Americans built thousands of Dakotas alone, it is demonstrable we must have an Air Force.

There has recently been published a report by the Secretary of Defence in Washington which sets out with bludgeon clarity the scope of American preparations. As it is published in U.S.A., and unlikely to be available to most readers in England, here are some extracts from this document (which is a 140-page book packed with facts).

(It should be explained that U.S.A. has only recently switched to the three-Services system of Army, Navy and Air Force but the Navy regards aircraft as an integral part of naval affairs and therefore the situation is what might be loosely termed a 3½-Service complement of defence.)

The Army has no aircraft or air force. The Navy, next in seniority in U.S.A., plans to "expand to a strength of 50,100 officers and 409,900 men by 30th June, 1949." A year later the target figure is 62,000 and 500,000 respectively. Add to this 1,003,458 Reserves on strength 1st July, 1948, and there is quite a sizeable force.

Hansard gives the strength of the Royal Navy, which includes the Fleet Air Arm as one-third of its strength, as 118,000 Regulars, 19,000 National Service men and 7,500 W.R.N.S. Thus the Royal Navy is about one-quarter of the strength of the U.S. Navy.

For naval aviation the U.S. Navy programme for 1949 is a total aircraft strength of 14,500, of which 10,687 are listed as "operating aircraft." These figures are followed by a mystifying phrase: "Additional squadrons and air groups, required to provide two air groups per carrier, will be outfitted and several shore facilities for aviation will be reactivated to meet the expansion."

Nobody in England dare mention the strength of the Fleet Air Arm but even the wildest optimist would not assess it as remotely equalling the U.S. Navy figure.

Now for the U.S.A.A.F. This vigorous offshoot of the Army is, to borrow an old phrase, "some baby." The report gives the following potted information.

Strength of the American Air Force: 387,730 in 1948 and expected strength for 1949 is 444,500. Hansard's figure for the R.A.F. is 112,000 Regulars, 111,000 National Service and 14,000 W.R.A.F.

The fighting strength of the U.S.A.A.F. is given in the following terms: Unit strength in 1948 increased by 17 groups; a 55-group increment of a 70-group programme was attained by January, 1948, the 70-group target is scheduled for September, 1949.

"During the year the American Air Force introduced 13 new advanced models of aircraft, including four new fighters, three new transports, two new bombers, a high-speed trainer, a pilotless jet target plane, a helicopter and a cargo glider . . . Acceptances on new aircraft increased by 56 per cent.; within this increase was a 40 per cent. increase in acquisition of jet fighters."

Lest any impression be gained that the vast equipment programme is relying on World War II surplus, the Research and Development Board "reviewed approximately 18,000 projects, of which some 5,000 have been completed, superseded or cancelled, leaving about 13,000 active and inactive projects to be co-ordinated."

In a brilliant introductory summary, Mr. Forrestal, the Secretary of Defence, makes an important point on the subject of the U.S.A.A.F. and old, smouldering, inter-Services jealousies.

Saying that the Navy developed its air power as an integral part of naval organization whilst the Army (which in the recent war embraced the Air Force) only later in the war developed air power as a major strategic weapon, he says:

". . . neither the Navy nor the Air Force had much opportunity to become thoroughly familiar with the operations of its sister Service during the war. Most of the great naval task forces, with their closely integrated air power, operated in the Pacific. Conversely, with the exception of the operations of the Twentieth Air Force against Japan, the bulk of strategic bombing was done in Europe. Very few officers of either Navy or Air Force saw service with the other, and they all have a great deal to learn about the capabilities and limitations of each . . .

"Summing up: I believe the Air Force, in its long-range strategic bombers, has a weapon which will play a very great part in any future conflict but it has its limitations and should not be relied upon as the sole striking force to the exclusion of the Army and Navy. I believe also that the naval air arm should be preserved as an integral part of the Navy, but that its development should be in terms of its own mission, which is distinctly not a competitive one with the strategic Air Force."

After this avalanche, we in England might well feel justified in turning to the dew of Scotland for solace. Somewhat smugly we may select some of the flaws in the priceless gem presented to us—for Mr. Secretary has to admit 85 per cent. of the Army who are entitled to "sets" (fantastic American word for the English "married quarters") will still be unhoused.

But they have the edge on us on pay. On 19th December, 1947, a Commission was set up, and this found that "pay rates should be related to the responsibilities of the individual's duties," and thus broke with precedent in that responsibility rather than longevity of service was the factor governing remuneration, although by an Irish twist pay is related only to rank. General Eisenhower, for example, was a substantive Lieut.-Colonel but as he accepted responsibility and discharged that to our everlasting gratitude he was accorded the necessary rank and automatically the fair pay accompanying that rank.

But these preceding paragraphs, which could strike despair into the heart of the chicken-livered, will be accepted by the knowledge for their true worth. Let nobody despise mere numbers: Napoleon declared the art of war was to have two soldiers where the enemy had one. But, as with every other generalization, the reverse is true: Thermopylæ stands in history as to what a small force can do, and no more telling words on this subject have ever been written than by Francis Bacon, from whom I quote, to enhearten us all, freely:

"Walled towns, stored arsenals and armouries, goodly races of horses, chariots of war, elephants, ordnance, artillery and the like: all this is but a sheep in a lion's skin except the breed and disposition of the people be stout and warlike. Nay, number itself in armies importeth not much, where the people is of weak courage; for (as Virgil saith) it never troubles a wolf how many sheep there be."

Down through history comes the legend of the Spartan king who, told that the enemy was so numerous that the sky would be obscured with their arrows, magnificently answered: "Good—we shall then fight in the shade."

Turn to Gibbon and see, repeatedly, that mere numerical force was never any criterion of effective force. The race, says one sage, is not necessarily to the swift neither is the battle assured to the strong: but Time and Chance happeneth to all men.

Study the verdicts of history, and the answer is invariably the same. There is, or should be, no need to quote the author of: "The minds of men were gradually reduced to the same level, the fire of genius was extinguished, and even the military spirit evaporated . . . Their personal honour remained, but they no longer possessed public courage, which is nourished by the love of Independence, the sense of national honour, the presence of danger, the habit of command."

When the army multitude, presenting a front very much as is evident today, rose to near mutiny, Alexander Severus harangued them in scornful terms. "Reserve your shouts" said the undaunted Emperor, "till you take the field against the Persians, the Germans, the Sarmatians . . . Be silent, or I shall no longer style you soldiers but *citizens*."

The answer to the question as to whether there will or will not always be an air force lies not so much in the logistical question as to whether there are so many aircraft or so many pieces of equipment. It lies in the immutable fact that Man is superior to the Machine, that Man—not a machine—conquered the air, and also that Man has to live in the world, not that the world is made for a Machine.

Fundamentally, an "Air Force" must mean a force in the air. It breaks no secret to assert that the days of piloted aircraft are numbered: to the mystic words Mene Mene Tekel Upharsin the moving finger can write two more words—Bikini and Missile.

Although the modern, infected with the virus of cynicism, tends to assume a hopeless apathy or a cheap indifference to Kipling, that master of words inspirits us with his magic when we read his words that are so apposite today:

So when the world is asleep, and there seems
no hope of her waking.
Out of some long, bad dream that makes
her mutter and moan,
Suddenly, all men arise to the noise of
fetters breaking,
And everyone smiles at his neighbour and
tells him his soul is his own!

"This Atlantic pact, if we can bring it to a successful conclusion, does not give us the certainty of peace. No pact, no human achievement can do that. But it may give us a chance to establish peace in the future; and it is essential to our security in the present. It is certainly our best hope now for the prevention of aggression. It is our best hope for the establishment of relations between the two worlds on a basis, if not of friendship, at least of mutual toleration. That would give us time for men's minds to change and their souls to be freed so that toleration may turn to something better. That is all that we can ask for at this time from an Atlantic pact, but that is much and I think it is within our grasp."

—The Prime Minister, Mr. St. Laurent, in the Newfoundland House of Commons.

Education in the Royal Air Force

By Group Captain C. W. Pollock, M.A., R.A.F. Education Branch

In 1944, The Royal Air Force Quarterly published a series of notable articles on education. At that time victory was in sight; men and women everywhere had a sense of the heroic; they felt that it was possible to take a grip on the future, to avoid the pitfalls and shortcomings of the past; and they had confidence that with inspired planning and leadership the "full" and "the good life" might be possible for all. British men and women, and especially those in the Armed Forces, had passed through the "Valley of Humiliation" and were now almost within sight of the "Delectable Mountains." A high proportion of the most vigorous minds and spirits were in the Forces, and to indulge in educational experiments was natural to men who had been participators in high achievement in war and who expected that through similar co-operative action they could mould their peacetime future.

The fervour of Squadron Leader Ginnett's article, "Education for Greatness," with its appeal for a new approach to education stimulated the pens of other writers, among whom Group Captain C. L. M. Brown wrote of "Education for the R.A.F.." He described what he thought the aim and direction of education in the post-war R.A.F. should be, and indicates the prerequisites necessary to fulfil the aim. He was careful to describe what he meant by education —"Some planned system by which people increase their knowledge and understanding, enlarge their capabilities and enrich their experience," a description with which in general I agree.

Almost four years have passed since he wrote, the victory has come and gone, the Royal Air Force has substantially emptied its ranks of those who built the victory. The great majority turned to the next task of rehabilitating themselves and of creating the brave new world of their imaginings. Meanwhile the Royal Air Force was reshaping itself to meet the needs of a tired, but hopeful, Britain. It is a good time to take stock, to see how far we have progressed since the optimistic days of 1944, and possibly to indicate what yet lies ahead.

E.V.T. and G.E.S.

The feature of 1945 and 1946 was the Educational and Vocational Training (E.V.T.) Scheme which overshadowed the slowly reviving General Education Scheme (G.E.S.) by its threefold emphasis on vocational training and academic education with a vocational bias, on education for leisure (in the shape of music circles, handicraft clubs and the like), and on a compulsory element of one hour a week to be given to instruction in citizenship and current affairs. The interest of the great majority of airmen and airwomen was in release, and what was to happen afterwards; the responsibility of the Government was considered to be the provision of all facilities through which temporary members of the Armed Forces would prepare themselves for civil life. The education of the regular airman, except in so far as it was directly useful in training, for the time being took second place. Six hours of Service time each week were allowed to those who wished it and could be spared from duty. To carry this great load the education staff was multiplied nine- or ten-fold by the establishment of E.V.T. instructors—a body of nearly 10,000 officers and airmen who were trained in a number of E.V.T. schools for instructors which were specially set up for the purpose.

During 1946 educational and vocational training was running at peak, except in India and the Far East, where war conditions prevailed longer than elsewhere. Towards the end of the year the Air Council decided that the scheme should cease on 31st December. Though the decision was received with regret because there was so much still to do, it was obvious that the education staff could not have carried the full scheme much longer because of the rapidity with which the wartime members of the staff—both education officers and instructors—were being released. On 1st January, 1947, E.V.T. was no more and the General Education Scheme resumed its place as the main organized scheme of education in the Royal Air Force other than the schemes which had their place in the training establishments.

But it was G.E.S. with a difference. The well-known features of pre-war days, the reclassification tests, the promotion examinations, the specialization examinations for short service officers and the higher education test, were missing. Instead, the objectives for study still lay outside the R.A.F. and they were approached by means of correspondence courses, attendance at external education institutions which provided technical instruction and full-time courses (for instance in domestic science and current affairs) arranged by the Regional Committees for Adult Education in His Majesty's Forces. Handicrafts remained a prominent feature of the scheme, an interesting fact when one recollects that instruction in handicrafts was expressly excluded from the educational schemes of the pre-war Air Force. A new charter for the G.E.S. was published in Air Ministry Order A.1049/1946 on 23rd December, 1946. But the tradition and practice of E.V.T. continued for some time because what remained of the staff was trained in the E.V.T. tradition, and many members of the R.A.F. did not know that a scheme of over twenty years' standing was being revived. The very considerable changes that were being introduced into the General Education Scheme, some of which were the results of wartime experience, were not fully appreciated, and for the moment passed almost unnoticed. Until the wartime population and body of instructors gave place to men who were going to carry on in peace, it was not to be expected that the long-term pattern of the General Education Scheme would become apparent in action. It would be well perhaps to leave consideration of the scheme for the moment, and turn to the topic which was at the time receiving much attention at the Air Ministry. This was the problem of staff.

THE EDUCATION BRANCH

The flight from the Air Force during the release period affected education officers and instructors as well as those whom they taught. When E.V.T. came to an end, the ranks of the education officers had grown thin, and though for the time being the deficiencies were made good by the retention of E.V.T. instructors in education officer posts, the lack of professional education officers was severely felt, and crippled the development of education in both the training establishments and the stations. The war brought special troubles to the R.A.F. Educational Service, the members of which, though employed and paid as Civil Servants, wore uniform as embodied officers of the R.A.F.V.R. Criticisms were made which led to a committee being formed, under the Chairmanship of Air Marshal Sir Grahame Donald, to investigate and to make recommendations for the future organization of the Educational Service. As a result, the Air Council decided to form an Education Branch of the Royal Air Force, in which the members should hold regular commissions. The Branch came into being on 1st October, 1946, and the members of the old Service, with a few exceptions, were transferred to it in appropriate ranks.

This was a constitutional change of supreme importance, calculated not only to integrate education more fully into the life and work of the Service but also to secure maximum contentment and satisfaction on the part of the education officers themselves. Within a period of months after the vital decision had been taken the formula was found and nearly 160 permanent members of the old Educational Service made the transfer to form the nucleus of the new R.A.F. Education Branch and to prepare the way for the future. This number, though supplemented by about an equal number of war-time temporary officers who remained, was far too small to meet the demands of the post-war Air Force. From 1939 no appointments had been made to the permanent list of education officers and, in consequence, the members of the war-time staff had had no opportunity to apply for assimilation to permanent commissions in the Education Branch. The great majority were not tempted to maintain their connection with the R.A.F. through the medium of a short service commission. By the summer of 1947, the numbers reached their lowest mark and, in the face of a depleted market in graduates and the hard competition of many attractive appointments in civilian life, the young Branch had to make its bid for new blood and the means to live. At first recruiting was disappointingly slow, but gradually improvement began and, although the Branch is a long way yet from being adequately manned by professional education officers, hope is by no means lacking for its future growth and well-being. In these circumstances, however, it would be foolish to imagine that all is well with education in the R.A.F. The educational task is greater than ever it was, but as yet there are not enough officers with professional qualifications to shoulder it. In the meantime the gaps are being stopped by officers and airmen of other branches of the R.A.F. who have suitable qualifications and are trained for the task of being temporary educators.

CHANGE OF ATTITUDE

This radical constitutional change does more than provide for administrative improvement. It is symbolic of the change of attitude within the Service towards education itself. Before the war, that part of education which catered for directly useful ends in the training establishments was, of course, taken for granted. The non-technical subjects like history and English were for the most part accepted, though not generally with enthusiasm. When the airman found himself on a station after passing out of his training course, he discovered that the means for self-improvement existed in his new home, but the courses were voluntary and most of them had to be undertaken in the evenings. There was a provision in the King's Regulations which allowed airmen Service time for study, subject to their giving an equal amount of their own leisure time. Progress depended to a large extent on whether the Commanding Officer believed in education and was willing to make the way easy by allotting good and attractive accommodation, by providing for attendance at classes in Service hours and by encouraging the station education officer. The latter being a civilian and the scheme being voluntary, it can well be imagined that in many places education was regarded as a frill. Its value to many officers of the R.A.F. lay in the help it provided to pass promotion examinations and reclassification tests. So far was this true that on the outbreak of war in 1939 the General Education Scheme was put into cold storage and the educational element in the training courses was reduced to what was considered to be the minimum necessary for the speedy creation of a wartime airman.

Less than a year passed before education was reintroduced on the stations as an instrument for maintaining and improving morale. Before long, too, more and more educational subjects were being introduced into the training syllabuses. So completely did the pendulum swing that one found that the early training of aircrew candidates was to a large extent in the hands of the education officer teams in the Initial Training Wings. In the hard school of war, education was shown to be an essential and not a frill, and towards the end of it, nothing short of "Education for Greatness" and "Education for the Full Life" was thought good enough for the Air Force of the future. Thus the integration of the educational staff within the Royal Air Force was the counterpart and complement of the integration of education in the life of the Service which seemed inevitable at the end of the war.

The post-war pattern of education is, in outline, not very different from that which was in operation before the war. All who know the Royal Air Force are aware of the two main features of this pattern, namely, education which is part of the professional and technical training of officers and airmen, and that which is available in the post-training period on the stations. It is not necessary to repeat the details of these schemes but to indicate in what fashion and to what extent the two features have changed and are changing.

Technical Efficiency and the Humanities

It is perhaps well to remind ourselves that though education is, ideally, an instrument to promote "the good life," the Royal Air Force is a technical Service and that its usefulness to the national is in direct relation to its ability to use machines and instruments of all kinds. The first object of training, therefore, is to create the efficient pilot, navigator and mechanic. Officers and airmen are concerned with engines and aircraft, weapons and instruments, piloting, shooting and bomb-aiming. And according to the degree of skill required by a tradesman, the period of training varies between a few weeks and three years. The complexity of the task of the Air Force is indicated by the number of technical courses provided by the training commands. These courses number about eighty and in all of them the main part of the educational element is directed towards achieving technical efficiency and accumulating scientific knowledge. In this directly useful training a notable change is in the amount of theoretical work to be done. The officer courses at the Royal Air Force College at Cranwell are longer than in pre-war days by more than six months and the educational content is about one third of the total. The theoretical subjects, mathematics, physics, mechanics, aerodynamics and the like, are more closely co-ordinated with the technical training.

There is a similar change in the schools for training aircraft apprentices; here we find more subjects and a greater scope than before. The educational content of the syllabuses has been raised by about fifty per cent. In particular the courses for the wireless and radar trades have been taken much more into the classroom than in earlier days.

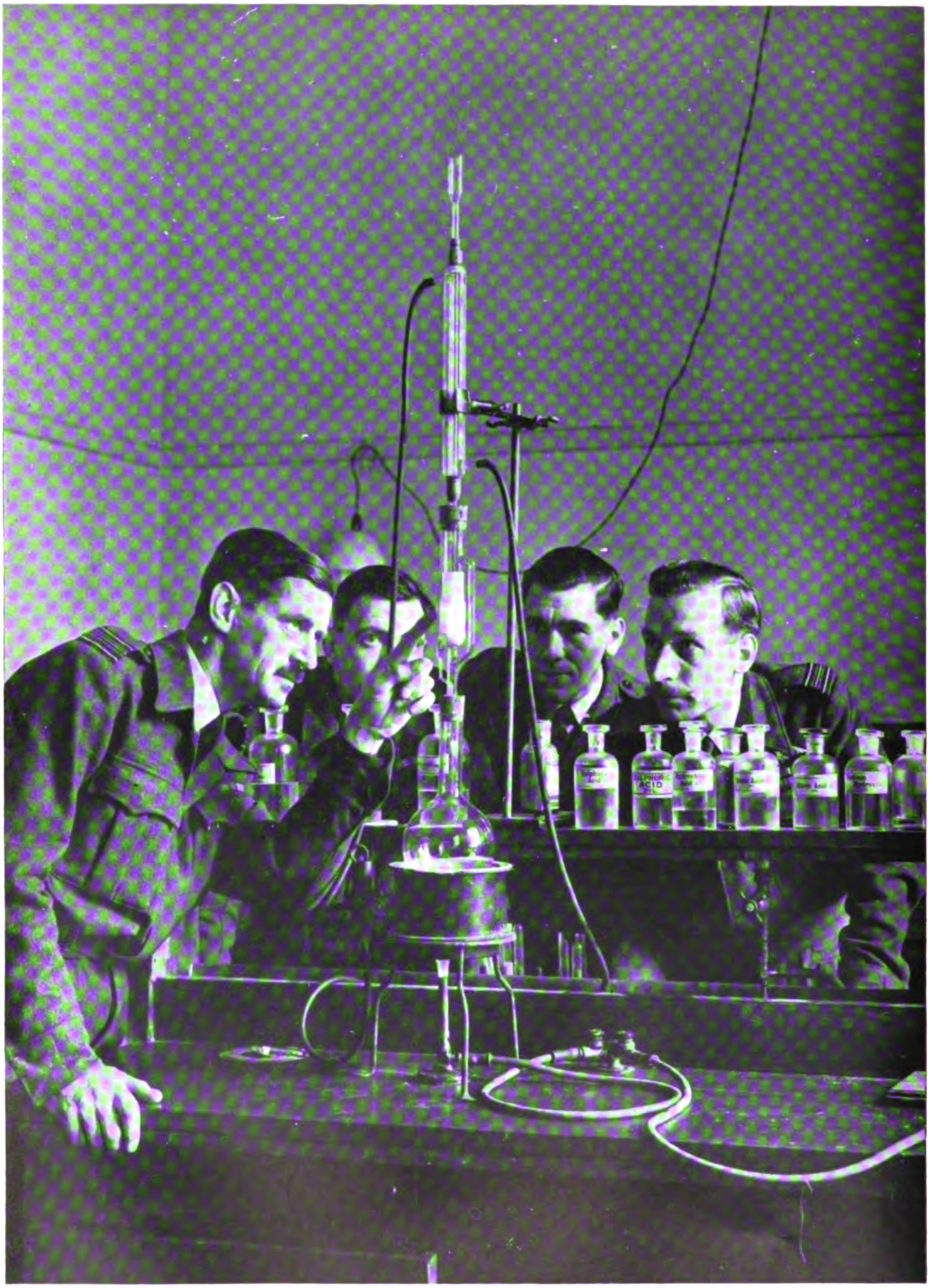
But, while remarking the increase in content and variety which has occurred in the education with the training establishments, there has been no diminution in the time given to the humanistic subjects, history, geography, literature and modern studies. From the beginning, the teaching of the humanities has been regarded as an essential part of the training of the long-term Regular officer and airman. The motive for introducing this element into the courses in the 1920's was perhaps narrower than we should now acknowledge to be good, in that we visualized the fully trained, all-round airman. But the teaching of those days achieved more than its immediate purpose. The whole of the teaching together went some distance towards producing the complete airman-citizen which is the aim of the present time. To the already well established courses in humanistic subjects has been added the first part of a course of instruction in citizen-

AT THE R.A.F. COLLEGE

A class of Cranwell Cadets under instruction with an E.O. on a Sabre engine

EDUCATION OFFICERS

The Education Officer in this picture is an N.S.A. man. He is recruited as a Pilot Officer and is employed on the Education Staff of a Fighter Station. He is seen taking a class of airmen and airwomen in a geography lesson.



An Education Officer demonstrating how to analyse a sample of explosive taken from a 500 lb. bomb

Face page 101

ship, a course which the airman will find to be continued on his station after he passes out of his training establishment. This addition is part of the "Further Education" which is to be provided for all young adults under the Education Act of 1944, and for which the Service authorities have been made responsible within the Armed Forces under the National Service Act of 1947. It gives formal recognition to an idea of which the Royal Air Force was perhaps not sufficiently aware in the past, namely that the Service responsibility for its members did not end with physical fitness and trade efficiency, but included the whole man, as airman, as citizen and as individual.

INSTRUCTIONAL TECHNIQUE

Another important extension of the scope of educational work lay in the training of Service instructors. This was begun during the war when the need to train large numbers of men rapidly was of paramount importance. The value of the courses was very quickly seen to be more than transient, and this training in instructional method has become a permanent feature in the training commands. To describe the work, I cannot do better than quote the words of the present Director of Educational Services at the Air Ministry in a recent paper on "Education in the Royal Air Force" read to the Association of Technical Institutions in June, 1948.

"There was nothing revolutionary," he said, "in our approach to this attainment of more efficient instruction. It would be correct to describe it as a careful examination of existing methods in the light of changed conditions, followed by a ruthless casting aside of those practices which had outlived their usefulness and adapting and developing those which were good. With the aid of a specialist staff of applied psychologists, it was proved possible by experiment and experience to "pre-select" a tradesman of adequate intelligence, who through the medium of a short course, could be made into a reasonably efficient instructor. In this course he was, in a realistic way, made familiar with the broad principles of both teaching and learning, and he was shown how to apply these principles of instructing in the specific subject of his trade. It was necessary to get the potential instructor to accept the general principles not as academic pronouncements but as commonsense truths and also to ensure that his subsequent instructional duties were restricted solely to the teaching of a well-defined part of his trade. For this purpose a number of specialist instructor schools were provided. Thus there was one school for the training of instructors of the armament trades, another for the fitter trades, another for the signals trades, and so on. The results have shown beyond doubt that a short, well-planned course in instructional technique, conducted by expert education officers, can bring out in a selected tradesman the necessary qualities and abilities to carry out instructional duties satisfactorily. It is now an important aspect of technical and, indeed, of most ground training, that instructors shall have passed through a course of instructional technique at the specialist instructor schools. Not only is the subject to be taught broken down in a rational way, but specific advice and guidance are given by the education officers to the potential instructors on how to teach it."

SCHOOL OF EDUCATION

A significant innovation in the field of educational training has been the establishment of the Royal Air Force School of Education. In pre-war days, the appointment of the civilian education officer was accompanied by little or no preparation for the new life and work he was entering. Theoretically he was a fully-trained professional man who was competent to undertake a production job immediately. So far as he had to break new ground, as a rule he had to learn by doing. Immediately prior to the war, a move was made to reduce this obvious handicap to the man who did not know Service life, by attaching him for instruction to a school or unit; but this, though allowing the newcomer to take a breath and look round, hardly touched the problem of training him. Nowadays, the young officer, if he has not already experienced Service life in commissioned rank, undergoes training for officer service at the O.C.T.U. and when this is completed satisfactorily he has a month's course in the School of Education to fit him for his professional task. The aim of the course is threefold. First, it shows him the attitude of the Air Force authorities towards education, and how in some ways the approach to education differs from the outlook and experience of civil life; secondly, the pupil learns about the organization and administration of education in the Royal Air Force; and thirdly, he receives some instruction in the theory and practice of educational method. When he goes to his first post, therefore, he has a fairly good idea of what the R.A.F. requires of him, he knows what means and aids await him and where he may look for guidance in difficulty.

All high-grade schools in the Service tend to become authoritative in a technical sense. The teaching, in the course of time, is regarded as the accepted Service doctrine; the practice in the school will set the standard for the classrooms of the training establishments and the stations. Moreover, no good school remains simply the permanent purveyor of conventional doctrine and method. It becomes a laboratory where current thought is criticized and experiments made with new methods. The results of criticism and experiment become the doctrine of tomorrow. The high importance of the school lies, not merely in the training of the young education officer, but in the provision that is automatically made for improvement and progress in Air Force educational practice.

Though the main function of the school is to train education officers, for the present at least it has the secondary tasks of training education assistants (normally N.C.Os.) who are standing in for education officers, and officers of other branches who are to undertake some of the instruction in the compulsory courses in citizenship. A syllabus to cover a year's training in citizenship has been worked out at the Air Ministry, and in attempting to impart this to men under their charge, the officers who do not normally make contact with educational work will, in increasing numbers, come to understand and participate in the creative educational work of the Royal Air Force.

FURTHER EDUCATION

Education in the training establishments takes up so much of the time and attention of the Education Branch that one is apt to forget that, for the young officer and airman, training is only a phase—and a short one at that—through which they hope to pass quickly to the mature operative life of the Service. For each month spent in training, the average airman gives at least three as a trained man. Some give much more, and the average permanent officer will give ten times as much. It is on the stations, therefore, that one should find the best and most varied opportunities for "Further Education," for it is there the members of the Force will live much of their lives. The aim is that this shall be so, and a glance at Air Ministry Order A.1049/46, mentioned earlier in this article, will indicate generally what facilities are to be offered. Whether they are properly and fully used depends upon officers and airmen themselves, for the scheme is largely voluntary. But, since this A.M.O. was written, several specific tasks have been added to the General Education Scheme.

First, there is the compulsory element mentioned in Air Ministry Order A.373/48, which requires commanding officers to provide in Service time "(a) two hours a week, in the case of all airmen and airwomen during the first year of service, one hour to be devoted to citizenship and current affairs and one hour to general education, and (b) one hour a week for training in citizenship and current affairs during the second year of service." This is the most direct link with the national scheme for adult education, and the provision ensures that the young adults who enter the Royal Air Force, whether as voluntary recruits or as National Service entrants, shall have, as far as may be, the same kind of treatment and opportunity as their fellows in civilian life.

Secondly, the reintroduction of promotion examinations for officers ensures that a period of study in imperial geography and world affairs shall be undertaken by all officers who are moving towards the rank of squadron leader or aiming at qualifying for selection for the Staff College. Similarly, a recent Air Ministry Order (A.830/48) introduces the "R.A.F. Education Test" which is not at present compulsory. To quote the A.M.O., "Part I may be regarded as the equivalent of an educational test for reclassification to leading aircraftman or leading aircraftwoman and Part II is the equivalent of an educational test for promotion to corporal (instead of the pre-war requirement of an educational test for promotion to the rank of sergeant)."

VOCATIONAL GUIDANCE

These additions to the scheme point to a revision of emphasis as compared with the state of things at the beginning of 1947. At that time, as I mentioned earlier, the emphasis was on the need to assist the men and women who were returning to civilian life after several years in the Service. Now, with a new generation, it is primarily, though not exclusively, upon the need to improve and help the young man as an airman. He must be educated to serve the Royal Air Force to the best of his ability while he is in it. At the same time, he must have all the opportunities that exist in civilian life for cultural and self-improvement. These, as a citizen, he is entitled to have. And as he approaches the end of his term of service, he must have whatever help can be given to make his transition to civilian life easy and profitable. Here it is opportune to note that vocational guidance is now a function of the education officer. (The Vocational Advice Service of the war period came to an end in 1947.) The bulk of the work will fall on the station education officer, but when further investigation is required, including a test of an applicant's aptitude, the case is referred to the group education officer, who is trained in the technique of vocational guidance and in the assessment of aptitude and personal qualities.

LINKS WITH CIVILIAN EDUCATION

One hears, from time to time, expressions of regret from older members of the Service that the Higher Education Test has not been restored. To many airmen it was the high point of academic achievement. To them it was voluntary and had nothing to do with promotion or direct usefulness. It was largely education for fun and for its own sake. There is always a little sadness when something that is valued passes. But it looks as though H.E.T. has had its day. What will take its place has not yet been indicated. We could reasonably look forward, perhaps, to a closer linking with the civilian world in higher education. As the schemes for "Further Education" take shape in the counties and towns, so may we expect Air Force Education to follow. The introduction, under the auspices of the Ministry of Education, of a new examination for a General Certificate of Education in two or three years' time has already been foreshadowed, and it would be natural and wise, if practicable, to use the same scheme in the Air Force.

One other link with civilian education has already been made. The "Central Committee for Education in His Majesty's Forces" which is the successor of the wartime "Central Advisory Council for Adult Education in His Majesty's Forces" has been set up in London to administer a scheme under which civilian lecturers and teachers may be readily available to assist in Service education. In areas where there is a sufficient number of Service men and women, a local committee associated with the extra-mural department of a university is to be set up. R.A.F. stations will be able to ask for lecturers and teachers up to the limit of the money supplied by the Service Ministries for this purpose. This is a valuable addition to the resources upon which the station education officer can draw and should be of great help in the teaching of citizenship and current affairs.

This, in outline, is the record of R.A.F. Education in the last four years. As with other branches it has been a time of great change. A great deal has been done since the E.V.T. scheme ended and the lines of development are plain to see. On the one hand, there is a steady move towards a greater integration of education in the training establishments and education on the stations. On the other, there is an increasing amount of co-ordination with the national schemes for adult education. In another four years these tendencies should be nearing fulfilment. The aim is clear; the will and the organization exist; the greatest need is a full complement of professional staff.

Development of Air Task Forces as a Means of Securing World Peace

By Flight Lieutenants G. W. W. Waddington, D.F.C., and Eric Cook, D.F.C.

POLITICAL SURVEY AND GENERAL OUTLINE

EVENTS since the end of the war have resulted in the emergence of certain ideas and facts which, taken collectively, can be the foundations of future peace, and which form the basis of the proposal to develop Air Task Forces to safeguard that peace. The principle foundation stones of the argument are as follows:

(*a*) The only direction from which major aggression can come is from the U.S.S.R. and the countries behind the Iron Curtain.

(*b*) The Western Powers*, i.e., the United Kingdom, the British Commonwealth, the United States of America, France and the Benelux countries, are not interested in aggression but will oppose it with all the means at their disposal.

(*c*) In any future war for the security of "the West," there can be no neutral power, and it is essential therefore that such countries which are not now associated with Western Union, the Atlantic Pact, and the British Commonwealth, should be persuaded to become so at the earliest opportunity.

(*d*) The primary weapon for ensuring peace or conducting any war on behalf of the Western Powers is an air force, whose striking power should be greater than that of the U.S.S.R.

---

* In succeeding pages the term "the West" or "Western Powers" will mean all countries outside the influence of the U.S.S.R.

From the foregoing the size and disposition of this air force becomes of paramount importance, and in addition, such questions as to what each country shall contribute, and who shall direct the air force, must be faced realistically.

The lessons of 1919 to 1939 and 1939 to 1945 have proved conclusively and in a multitude of ways that the weapons which can deal with any potential aggressor in the most efficient and economical way, is an air force. In the past, however, each nation had its own air force and was purely concerned with its own national problems; now the need is different. The need now is for an international air force, capable of effectively defending the West, and if necessary providing such a hard initial blow at the first sign of aggression, that further military action on the part of the offending nation would be stifled. The question now is how can the present air forces of the countries concerned be best employed in this international fashion, and what provisions can be made for future efficiency? At this point the proposal for organizing and developing Air Task Forces is put forward.

Briefly the idea is to create several Air Task Forces each composed of bomber, fighter and transport components and located at strategic bases situated in some of the countries identifying themselves with the West. In this way it will be possible to encircle the whole danger area.

Owing to the depleted state of the air forces in the principal Western countries, the force will be initially Anglo-American. The Air Task Forces would be strategically mobile in the fullest interpretation of the phrase, and it is for this reason that a transport component has been included in the force.

BROAD OUTLINE OF THE USE OF AIR TASK FORCES

Before going into any details of composition and organization, it is intended to prove the worth of Air Task Forces by outlining the uses to which they could be put.

Looking at the problem from a detached and international point of view, it could easily provide the basis for the formation of an International Force for the keeping of law and order as required under Article 45 of the United Nations Charter. Undoubtedly the most effective force with which the United Nations could influence the path of world peace would be an air force.

The strategic disposition of the Air Task Forces is such that assuming a bomber range of 1,500 to 2,000 miles, nearly all industrial centres and areas of vital economic importance in the U.S.S.R. can be reached. The encircling ring of Air Task bases will prove a tremendous deterrent to the aggressive principles outlined in the Cominform Proclamation of 1947, and a powerful argument at the diplomatic table.

In addition to these concrete arguments the moral effect of such an international force on the West European countries cannot be ignored. That it is feasible cannot be doubted and who knows, it may provide a positive lead to further large-scale international co-operation in other fields, as required under the European Recovery Programme. Having mentioned the broad uses of Air Task Forces, it now remains to examine their employment, first in war, and second in inter-war conditions.

EMPLOYMENT IN WAR

The magnitude of the blow which an Air Task Force can deliver against an aggressor will not only depend upon its size but on a decision to use or discard the atomic bomb. Much has been said on this controversial point and it is not intended to go into a deep argument on the subject. It must be assumed, however, that until Russia has the bomb it will be used by the West. While it is a ghastly weapon, it is the one sure means of delivering a large, decisive blow at Russia's potential, thus preventing the possibility of a long war of attrition. On the other hand, if the U.S.S.R. discovers the secret of the atomic bomb and is able to produce them (this seems to be only a question of time) there is the certainty of retaliation. Does this mean then that the atomic bomb will be put aside in the same way that gas was shelved after World War I? It is a possibility which cannot be ignored and it is this latter assumption which should guide the development and use of Air Task Forces. This then means the use of Air Task Forces in war as follows:

- (*a*) Maintaining pressure on all sides of the U.S.S.R. by co-ordinated, and round-the-clock strategic bombing of vital centres.
- (*b*) The movement around the strategic circle of Air Task bases by individual Air Task Forces, in order to reinforce their fellows with the object of bringing to bear overwhelming force in a particular theatre of war, and thus achieving a quick and decisive victory.

The question of day or night bombing cannot be answered here but the moral effect of round-the-clock bombing cannot be over-emphasized. Fighter protection for day operations may be necessary; fighters most certainly should be provided to defend the Air Task bases.

Rapid movement and the maintenance of

essential supplies, plus the rendering of air transport assistance to other Air Task Forces will be the work of the transport component. It will be appreciated that this component must be extremely flexible and care should be exercised in its use. For maximum efficiency and economy the transport component will come under the direct control of the Commander-in-Chief Air Task Forces.

EMPLOYMENT IN INTER-WAR YEARS

In addition to justifying itself in its role as a rapid means of carrying the offensive to the enemy, and providing a deterrent to aggression, the Air Task Forces will have peace-time roles which, in addition to providing the forces with a high standard of efficiency, will help to offset the drain on the exchequers of the countries concerned.

It will be appreciated here that in the present Royal Air Force and United States Army Air Force Transport Commands, the Air Task Forces will have a valuable asset, only slight modification will be required to their existing structures in order to convert them into the air transport component previously mentioned.

The functions of the Royal Air Force Transport Command (disregarding the Berlin air lift) is at present):

(*a*) The preservation of Imperial air communications.

(*b*) The carriage of government officials and troops.

(*c*) The supply of overseas bases with high priority freight.

(*d*) The provision of a rapid air mail service.

These functions have only to be given an international aspect and the air transport component is in being.

It must now be asked what peace-time roles can be given to the bomber and fighter elements in the Air Task Force which will ensure a similar usefulness. In this respect the fighter element can have no real peace-time use. The contribution of the bomber force will be largely invisible in that there will be no apparent results, but it will provide, as always, a testing machine for the aircraft industry. In addition, it can make a valuable contribution to military intelligence, by undertaking large-scale aerial surveys of its theatre. The possibility of exploring new air routes or the improvement of existing ones should also be recognized as the task of the bomber element, while much valuable data for the future can be gained from global exercises in conjunction with the navies of the "West."

AIR TASK BASES

DEFINITION

A centrally-situated master airfield is visualized surrounded (within a radius up to 100 miles) by other satellite airfields varying in number from five to ten, according to the local geographical situation. The principal radio and radar facilities of latest design will be located at the master airfield, together with the main administrative and operational control.

GEOGRAPHICAL SITUATION

The disposition of the air task bases is of paramount importance and is governed by the maximum range of the Air Task Force, which, as stated earlier, will be 1,500 to 2,000 miles, although the ideal range would be 2,000 miles, and this should be aimed for.

When examining the distances which are involved in striking at Russia it is important to use a map which gives the most accurate idea of size and distance. A Mercator's projection is useless for this purpose and the reduced earth or globe should always be used. From examination of the reduced earth, the following countries present themselves as strategically suitable for the location of air task bases:

(*a*) Alaska / Aleutians.

(*b*) North and South Japan. (Perhaps South China, depending upon Communist activity and future U.S. policy).

(*c*) India / Pakistan.

(*d*) Iraq / Iran.

(*e*) Cyprus / Crete.

(*f*) Germany.

(*g*) Sweden / Norway.

A short time devoted to laying out a radius of 1,500-2,000 miles from each of these points will show that with the exception of the arctic regions the U.S.S.R. and her satellites can be covered by air power, and that the air task bases are within supporting distance of each other.

It may be asked why no provision has been made for attack over the North Pole. In our opinion this possibility is not feasible in the foreseeable future for the following reasons:

(*a*) The great distances involved would reduce the bomb carrying capacity of even the largest modern aircraft to such a degree that the Air Task Force would be rendered impotent.

(*b*) The difficulties of supplying an air task base on an adequate scale under sub-zero conditions would be almost unsurmountable.

(*c*) The special difficulties of flying and navigation in that part of the world.

RESPONSIBILITY FOR THE AIR TASK BASES

It will be appreciated that the air forces of the Western countries, apart from the Anglo-American ones, are run down and in a depleted state due to the war. Initially then, the aircraft forming the Air Task Force would be Anglo-American and to compensate for the effort put forward by these two countries the building and provisioning of the bases would be the responsibility of the countries in which they are situated. Afterwards a Common Defence Fund could be created from which financial re-adjustments could be made.

OPERATIONAL FACILITIES

As mentioned previously when defining an Air Task base the master airfield will be equipped with the latest radar and radio aids. A large selection is available and these will be listed and a selection made of those which we consider would be the most suitable:

(*a*) VHF/DF.
(*b*) Gee.
(*c*) Radio beacons and Loran.
(*d*) B.A.B.S./Rebecca/Eureka.
(*e*) Ground Controlled Approach.
(*f*) Cathode Ray D/F.
(*g*) Short Wave W/T.
(*h*) Standard Beam Approach.
(*i*) H25.

APPROACH

The following systems are selected for use with the Air Task bases:

(*a*) *Short Wave W/T*. For operational control of the bomber and transport elements and long-range communications. Situated at the master airfield only.
(*b*) *VHF/DF*. For short-range homing and airfield control. Installed at the master and satellite airfields.
(*c*) *Eureka/Babs/Rebecca*. For short-range homing and runway approach. Installed at all airfields.
(*d*) *Cathode Ray D/F*. For long-range direction finding (up to 1,000 miles). Installed at master airfield only.
(*e*) *Radio Beacons or Loran*. For long-range homing and stand-by descent through cloud. Installed at the master airfield only.

Another important facility which must be incorporated is some means of ensuring accurate bombing, especially under "blind" conditions. Much secrecy surrounds this subject, and concrete data cannot be obtained, but the improvements in technique and equipment made during the last war by the Anglo-American air forces make blind bombing an accomplished fact.

DEFENCES OF THE AIR TASK BASE

The dispersal of the Air Task bases within a radius up to 100 miles plus dispersal at each individual aerodrome is a defence in itself, and it is thought that any enemy force would have the greatest difficulty in eliminating the base. It is for this reason that the present type of anti-aircraft guns and all their attendant impedimenta are not recommended, but this policy would be reversed should a successful guided anti-aircraft missile be produced; until such a weapon is forthcoming the main responsibility for the defence of the area would, of course, rest with the fighter component, operating with the assistance of the latest radar early warning system.

COMPOSITION AND SIZE OF THE AIR TASK FORCES

With the exception of the transport component an all-jet Air Task Force is visualized.

AIRCRAFT TYPES

The bomber aircraft should have speeds in the region of 500 to 600 miles per hour, and a disposable bomb load (with a range of 1,500 to 2,000 miles) of five to six tons. This will mean that bombs up to the 12,000-lb. high capacity types can be carried; for shorter ranges, of course, the 22,000-lb. "Grand Slam" type or even a larger bomb can be carried. An operational height of 30,000 to 40,000 ft. is anticipated for the following three reasons:

(*a*) To ensure minimum fuel consumption.
(*b*) To make the bomber elements, as far as possible, independent of weather.
(*c*) Difficulties of interception at high altitudes.

Taking a long-term view, the fighter aircraft should be the latest production of the aircraft industries, capable of efficient operation above the sonic barrier, and having speeds and ranges (using drop-tanks) comparable to those of the bomber element. The main use of the fighter force would be the defence of the Air Task bases, but high ranges are necessary in case they should be required for daylight escort duties. Until the development of such fighters existing types are considered adequate for short-term use.

The armament of the fighter element should be made the subject of much development, as it is considered that more accurate and lethal means of destruction than those existing at present will be required at the higher operating speeds and altitudes. The production of such weapons would also give greater safety to the fighter aircraft using them. In this respect a fighter standing well outside a bomber formation and shooting in missiles is visualized.

No great changes are required to existing transport aircraft to make them suitable for use with these forces, except perhaps for the replacement of piston engines by gas turbines (i.e., turbine-airscrew units). These engines are suggested as most suitable for these reasons:

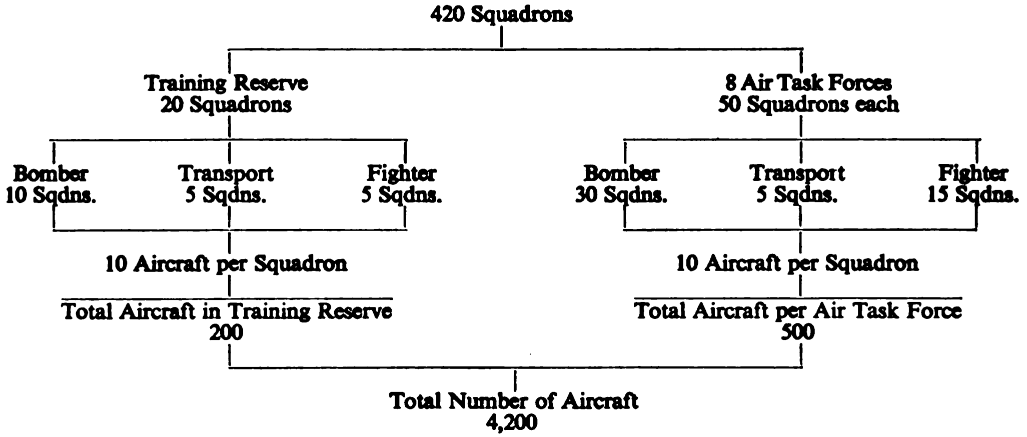
- (*a*) Transport aircraft speeds in excess of 400 miles per hour are not really required.
- (*b*) At these speeds the gas turbine engine will give a speed/fuel ratio greater than that of piston engines.
- (*c*) Reduction of vibration and greater passenger comfort.
- (*d*) Greater loads can be carried due to the resultant increase in power.

Transport aircraft for specialized duties within the Air Task Force will have to be developed, for example it will pay to cater for the problems involved in the carriage of ancilliary equipment.

To ease maintenance problems and ensure complete mobility the aircraft contained at the Air Task base should present a cross section of all types in operation, thus one base would contain English and American fighter, bomber and transport types.

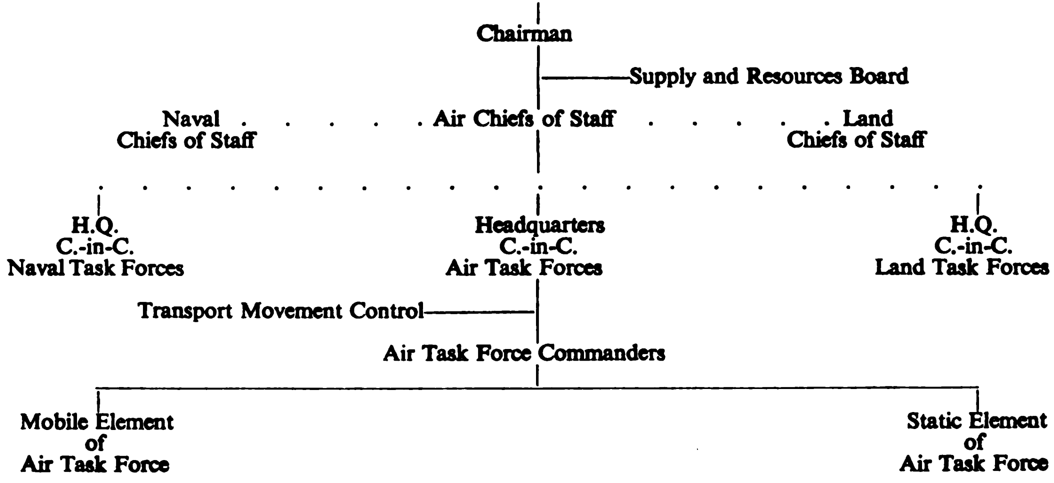
SIZE OF AIR TASK FORCES

The size of the Air Task Forces will be governed by the following principle. "They must be capable of delivering a series of concentrated offensive blows likely to seriously affect the aggressor nations will to war, and at the same time to achieve economy in man-power and materials." This is a most difficult combination to realize, and the view put forward here is purely tentative. One thing should be realized, however, the peace-promoting value of the Air Task Force will be directly proportional to its size; in other words, the larger the premium one pays the better the insurance value obtained. A total force of 420 squadrons is suggested, split up as follows:



APPENDIX I

WESTERN DEFENCE CO-ORDINATING COMMITTEE



At first sight the total number of aircraft may seem to be prohibitive but it should be remembered that several countries will be contributing to their cost and upkeep through the Common Defence Fund. If an estimate is made of the cost of a modern battle fleet and the total is transformed into aircraft we venture to predict that there will be considerably more aircraft than the 4,200 suggested, in addition to which their striking power will be far greater and swifter than that of any battle fleet. It will be noted that a training reserve has been suggested; this has been considered necessary for the following reasons:

(*a*) To provide a common training ground for personnel, prior to posting for duty with an Air Task Force.

(*b*) To provide information and experience on latest developments for the flying and technical personnel of the Air Task Forces.

ORGANIZATION OF THE AIR TASK FORCE

Control

This article would not be complete without a brief discussion on a chain of command, including a policy-making machine at the highest level. In this respect it has been found necessary to visualize the Air Task Force as part of a "Western" defence machine, which includes a naval and land element. To consider an Air Task Force to the exclusion of army and navy is not feasible, although it is again emphasized that the major part of "Western" defence will fall on its shoulders, the naval and land elements being subsidiaries.

The Western Defence Co-ordinating Committee would comprise the Defence Ministers of all participating countries and would be responsible for the control of the organization through the Chairman of the Western Defence Task Forces, who would carry out the wishes of the Committee and be responsible for the efficient employment of all arms and for overall planning. The Chairman would be assisted in his task by a committee consisting of the air, sea and land chiefs of staff of all the countries and by a Supply and Resources Board which would consist of small military missions. The execution of the plans of the chiefs of staff, together with detailed control, organization and movements of the Air Task Forces, would devolve on the Commander-in-Chief Air Task Forces. As previously mentioned, for efficiency and economy, control of the transport element is under the direct supervision of the Commander-in-Chief.

The Air Task Force Commanders (eight in number) would be responsible to the Commander-in-Chief for the direction of an Air Task Force in a particular theatre. They would have under their command a mobile and a static element. The former would consist of all commanders, operational planning staffs, the squadrons and all technical services; whilst the latter would consist of the normal administrative departments run mainly by civilian officials responsible to a senior administrative staff officer.

Personnel

As implied previously when discussing aircraft types, each Air Task Force will be of a mixed composition in personnel, as well as machines. This should greatly increase the co-operative spirit. There will be a language difficulty of course, for the non-English speaking countries will also be contributing personnel. However, as the preponderence of personnel would be English speaking, that should be the language of the Force.

In view of the multiplicity of aircraft types at one Air Task base, it is essential that there should be a nucleus of highly-trained service technicians capable of technically educating the bulk of the technical force who, in any case, should have a high standard of knowledge together with a good grounding in military weapons for defensive purposes.

The aircrew complement should also be of the highest standard, capable of all-weather flying, schooled in the use of radio and radar aids, and capable of carrying out administrative duties—especially is this latter condition important in the case of officers.

It follows from the above that the Air Task Force will be comprised of long-service personnel who should be paid in proportion to their extra qualifications. To obviate petty jealousies there should be no difference in pay between personnel of different countries; this matter would be the concern of the Common Defence Fund, mentioned earlier.

CONCLUSION

Enough has been said about the Air Task Force to prove its desirability and sufficient details have been given to show its practicability. In view of the lessons of the past quarter of a century it cannot be doubted that it will be efficient and economical, from a man-power and equipment aspect. It will provide a positive offensive weapon which can be put into operation at the shortest possible notice, bringing to bear a maximum concentration of fire on strategic targets; also, its structure is such that each Task Force can be rapidly expanded should the occasion arise.

During the war we had an Allied Air Force with one aim—the unconditional surrender of Germany and Japan. This aim was sufficient to bind together a vast fighting machine whose achievements have been admired by the whole world. The Air Task Forces will also need an aim, which in times of peace would be sufficient to hold them together and result in the sinking once again of individual differences in a common cause. Is the halting of Soviet aggressive policy and the neutralizing of the insidious dangers of Communism the answer?

Something must be done fairly soon; pacts and alliances are all very well, but the Western Powers must say "so far and no farther," and have the military machine to back up the statement. With such conclusive proof of "Western" solidarity surely Russia would hesitate to plunge the peoples of the world into another war.

Selection for Leadership in the R.A.F.

By W. G. Sheppard

THE selection boards have a difficult, and often thankless, task. If those they select make good, nothing more is heard of the matter; if, on the other hand, the selected do not make good, the boards are blamed—often quite unjustly. Unless the present officers are fundamentally sound, even the right young men will soon become the wrong young men. The point is that they are young; their characters are not set; and except in rare cases their attitude to the Service will be that of their seniors.

(i) That "leadership" has a single fixed meaning

The meaning, of course, depends entirely upon the context: a man who would be a leader in one sort of community might be a complete failure in a different kind of community. The mighty hunter, for example, who needs occasional intense bursts of energy and has long intervals of relative quiescence, is the leader in a hunting community. If he were compelled to live in a purely agricultural community, where a lower level of energy has to be continuously applied, he would develop neurosis and probably end in a lunatic asylum. (Perhaps a parallel can be found in the contrasting fighter and bomber operations.)

But even in a single community, such as ours, there are various kinds of leaders. There is, for example, the man who has little intelligence or initiative but by sheer will power, or force of personality, can extract from a body of men obedience to orders which he is merely passing on unquestioningly from above. Many such men rendered invaluable service in the "old style" Army; but they are not the stuff from which to make air marshals—or even humble group captains.

Then there is the "natural" leader, who is found when a body of men on an equal footing is faced with a sudden emergency. There is nearly always one who knows what to do and automatically takes charge. He may be, and often is, of lowly origin; but he has the quality of leadership, which for this purpose may perhaps be defined as the ability quickly to appreciate a situation; quickly to reach a decision; and quickly to act upon it.

The last implies self-confidence; the three together seem automatically to inspire confidence in others. If that confidence is to be retained, however, it is essential that the decisions should, in the main, be right. That, in its turn, implies quickness of intelligence, though not necessarily a very high order of intelligence.

This is the kind of leadership required in junior officers; and fortunately it is not uncommon. The fighting spirit, brilliant personal performance and the capacity for such leadership as is required in an operational unit are not the monopoly of any one class or type. There is thus a big field of candidates suitable for immediate purposes to draw upon; and only those who appear to have potentially the qualities needed for higher rank should therefore be selected for permanent commissions. The work of an operational unit needs young men as the qualities required are essentially those of young men. But the brilliant fighter pilot, or leader of a fighter squadron, with the passage of time loses some of these youthful qualities; and if they were his only asset he becomes nothing but a liability to the Service.

For higher rank, some of the qualities of the natural leader are still essential: better a wrong decision and the courage to act on it than vacillation, which is always fatal. A wrong decision in high quarters, however, can be so far-reaching in its consequences that every effort humanly possible must be made to ensure right decisions. Delay in reaching them is disastrous. But speed is a relative term. In a dog-fight hesitation for a split second may be fatal, whereas in larger matters it is calculation rather than instinct which is important. For this a high order of intelligence and profound professional knowledge are necessary.

A highly placed officer is a leader—good, bad or indifferent—whether he will or no. If we wish to know what kind of leader he should be, we must try to visualize an efficiently functioning Air Force as a whole. We may quite likely conclude that what is most needed in a senior officer is that he should be a good organizer, who at the same time is fertile in the sound professional ideas which derive only from a high order of intellect plus a profound study of professional problems. In other words, we may find that senior officers should be primarily of the student type—though not, of course, the weedy, myopic bookworms of the comic papers.

A characteristic of the earnest student of limited intelligence is proneness to overlook the obvious. It is almost unbelievable, after the event, that professional soldiers could have overlooked the fact that the Maginot Line had its flank in the air; but such things are of constant occurrence. Perhaps what is required, even more than brains of excellent quality, is reasonably good brains which are essentially active, constantly playing round a problem in an attempt to view it from fresh angles and ensure that no factor has been overlooked. In planning it is no use basing everything on one set of assumptions, which events may prove to have been unsound; it is necessary to provide not only for the probable, which in war seldom happens, but for all the possibilities.

Now a permanent officer is a junior officer for a few years, and a relatively senior officer for the remainder of his Service career; so we seem to have arrived at the conclusion that the qualities primarily to be sought in a permanent officer have little in common with "leadership" as it is generally understood. In the R.A.F. there is the regular chain of responsibility; everyone must obey all lawful orders, without "backchat" or effort to show who is the "natural" master.

Nevertheless there must be the right human relationships at all levels: a discipline which does not bring about the willing co-operation of all concerned (except, perhaps, a few recalcitrants who should be ruthlessly eliminated) is a bad discipline. But there is no finality about good discipline: its nature must depend upon the general social conditions of the community from which the members of the service are drawn. It is obvious that what served for the scallywags of Wellington's time would not do now; it is less obvious, but equally true, that what may have served as late as 1939 is not suitable for 1949 since something like a social revolution has occurred in the interval. Where there is a good discipline, however, the stricter it is the better, even the National Coal Board has discovered that to be so.

It might be a good idea automatically to court-martial the commanding officer of a station where there are serious disciplinary troubles (just as in the Navy when a ship is lost the captain is court-martialled). In general it is the commanding officer's fault—not necessarily because of any slackness on his part: the poor man may not know how to maintain a proper discipline, either because he was wrongly selected for a permanent commission originally or because the R.A.F. has failed to train him properly.

(ii) *That a man is a leader or is not a leader*

Everyone is potentially a leader to some extent. No matter what human quality is considered, every degree of it is to be found, from the highest to the lowest at which it occurs. If sufficiently large numbers are tested we get a distribution approximating to that shown by the famous "cocked hat" curve, with a bunching round the average value and a rapid falling off on either side of it. When once we have decided precisely what we mean by "leadership" it is comparatively easy to devise tests which serve to find outstanding candidates. The R.A.F., however, has no chance to skim off all the cream of the country's youth; a large proportion of the candidates coming forward are no more than average; and if the tests produce a wide spread among these—such as professional testers for excellent reasons usually like to see—the spacing is fictitious rather than real. In other words, leaving out the exceptional candidates, the selection is largely a gamble in our present stage of knowledge of how to assess personality. And, of course, the most carefully devised tests always eliminate the genius, because rules which apply to others do not apply to him.

(iii) *That leadership is an entirely innate quality*

The old "nature versus nurture" controversy long since died a natural death. There is now general agreement that heredity and environment (training) from a complex variable which cannot be separated into two components. What is tested, therefore, is not a purely "natural" quality but the result of heredity plus training. Thus an aircraft apprentice, for example, who for three years has only known discipline from what might be called the lower end, will show less apparent initiative than a youth of the same intrinsic quality who has been more favourably situated. All the stereotyped test can show in this connection is leadership *at the moment*. The candidates are all young; when the selected have met on equal terms for a few months, the original order of merit will have been turned topsy turvy. While therefore it is true that the R.A.F. cannot produce the best results from the wrong material, it is impossible to exaggerate the influence of R.A.F. training on the final product.

(*iv*) *That the R.A.F. does, or can, provide conditions in which the "natural" leader will necessarily come to the top*

A disciplined service does not offer the "free field and no favour" which gives the natural leader his chance. The natural leader only comes to the top by fighting, and finally eliminating his would-be rivals; and in the R.A.F. this obviously could not be allowed. It is not in the mortal members of the R.A.F. to command success; they can at most strive to deserve it. Promotion comes only from higher authority, whose ways—according to those who have been passed over—are inscrutable.

Although the system is not perfect, any other system is unthinkable. A fine Air Force we should have if the natural leader inevitably came to the top ! A commanding personality may be combined with all the wrong ideas; and then the more powerful the personality of the one in command the greater is the disaster.

We seem therefore to arrive at the unhappy conclusion that selection by the pure light of nature is almost valueless, and the findings of the psychologists must be taken with more than a grain (perhaps a ton) of salt. But things are not quite so bad as they might seem to be : there are two things that the scientific workers can do. They can establish beyond doubt how far the success of entrants agrees with their Selection Board category; and this forms some check on whether the boards have been properly briefed. It should be noted, however, that their criteria can only be subjective: an officer's success or otherwise is measured by what his superior officers think of him—possibly quite wrongly. And, in any case, many years must elapse before the selection of *permanent* officers can be validated.

They can also, by deduction from results obtained in other fields, suggest methods which seem likely to reveal any desired characteristics. What is certain is that they must be given more, rather than less scope. In psychology, unlike the natural sciences, it is impossible to separate the pure from the applied : it is in the applications that the principles will be discovered. The R.A.F. can no more dispense with science in its human than in its technical aspects ; and to find psychological principles which can be usefully employed in the R.A.F. the psychologists must be allowed to study the R.A.F. from many angles.

But what seems to be most urgently required at present is reconsideration of the brief which the selection boards have been given. It is suggested that what should be looked for in a candidate is : integrity; active brains of good quality; high educational standard; the qualities common to *all grades* (see above) of leaders; interest in all matters concerning the R.A.F. These are given in order of importance. Most of them cannot be assessed in a day, or even in a week ; they need observation over a long period.

How this is to be obtained, and what precisely is intended by the qualities detailed, cannot be dealt with here for reasons of space. But some comment must be made on the first and last items if complete misunderstanding is to be avoided. Integrity is put first because of all human virtues it logically comes first, and because complete faith in the integrity of those over them is the first essential for the morale of any body of men. The Concise Oxford Dictionary defines integrity as : Wholeness; uprightness; soundness; honesty. Yet its connotation is even wider than this. The man of integrity puts his best into any job he undertakes, because the scamped or shoddy is anathema to him; he considers at all times the welfare of those under him because that is part of his duties ; he never tries to shift his own responsibilities on to someone else ; and above all he is intellectually honest—he accepts facts as facts whether they are palatable or not, and does not try by casuistry to convince himself that black is really white.

Few members of the R.A.F. would agree to the omission of the last item in the list of desirable qualities, although it is really included in "integrity"; no man of integrity would enter the Service unless he were profoundly interested in the R.A.F. It usually includes keenness on flying, but more as a sport than as an end in itself. We are long past the stage when it was taken for granted that every air taximan must be an officer; and to seek a permanent commission merely in order to fly denotes a shallow, frivolous nature.

More important even than the right selection, however, is the training in leadership which must be provided by the R.A.F. itself.

Notwithstanding all that has been said above, all leaders, except perhaps the lowliest, have certain characteristics in common. They all have "fire in their bellies," that is, an intense desire to do things and the daemonic energy which gets them done. They are also able to reduce their own tempo when necessary to suit the naturally slower rhythms of their followers, and are approachable by those under them. These characteristics are probably partly physiological and partly psychological; at all events, anthropologists should know how to find them.

The suggestion that anthropologists might be utilized in the R.A.F. will cause some hilarity, since mention of them usually conjures up a picture of an emasculated little professor naively jotting down notes of the quaint, "sexy" rituals of "natives." Nevertheless, anthropology is the science in which all the other "human" sciences —biology, psychology, sociology, etc.—meet; and some uncommonly hard-headed men have been converted to the view that the principles which apply to primitive peoples will work also in our complex society. In America, for example, not only the Board of Agriculture but also some large industrial concerns apply them to their administrative problems.

Too much weight has probably been given in the past to the elementary type of leadership suitable for the infantry subaltern or the captain of a football team. But assuming that we know what we mean by leadership, it must be remembered that the real problem is to find suitable *officers*, leadership (if there is such a quality *per se*) being only one of the relevant factors.

The prewar method was to hold a competitive examination comprising educational subjects and an interview. There was constant pressure to give ever-greater weight to the interview on the grounds that members of the Board knew the type required and could estimate the quality of a man in a brief interview. Both assumptions are false: one of the troubles was that they *were* looking for a preconceived "type"—usually a public school type—and the other was that people who think they can judge a man in an interview merely delude themselves, as can easily be proved by a follow-up.

In view of this, psychologists (perhaps they should have been anthropologists) have been engaged to devise tests and to advise the Boards generally; and the question at once arises as to how far they can be trusted to deliver the goods. It must be remembered that all the human sciences are new sciences. This is not by accident: they were later in the field than the natural sciences because they are so much more complex and difficult. They cannot be studied entirely objectively; the subjective insists on intruding. The workers in a human science form part of the material they are studying: personal bias cannot be entirely excluded, although improved techniques are tending to minimize it. They cannot isolate their material or control all its variables; they cannot assert that so-and-so is *the* cause of a psychological phenomenon (it can at best be *a* cause) but, being human, they tend to do so. Much more is known about the human body than about the human mind, yet most doctors of any standing would agree that the physician's work is still more an art than a science. The new science of psychology too must for a long time be subject, in its applications to the ancient art of dealing with men.

A Synopsis of W.A.A.F. History, 1939 to 1948

BY SQUADRON OFFICER B. G. MARTIN

PRE-WAR

THE W.A.A.F. was formed in 1939 as an auxiliary force, to relieve men in a very limited number of ground trades. The only opening for women officers was to administer the women themselves, and these airwomen had only six trades open to them. The force was governed largely by its own regulations—or absence of them, and numbered roughly 2,000. We drilled madly, nearly killed ourselves learning the difference between mustard and tear gas, and took each other's cars to bits, to the everlasting detriment of the cars, and had a glorious ignorance of anything coming under the heading of R.A.F. procedure.

OUTBREAK OF WAR

Came the war, and the rush of women eager to join the new W.A.A.F. and take places beside their men folk—we gradually shook ourselves into a niche on the R.A.F. stations to which we were posted—and the process of integration of the W.A.A.F. with the R.A.F. had begun. When the uniform appeared we noted with pride that it conformed as nearly as possible to R.A.F. pattern and had identical buttons and badges, and on our station we fought and won a lively engagement with the Flight Sergeant i/c Equipment and were allowed into stores on a proper clothing parade. He blushed but bravely issued us with our full range of clothing.

Soon after the outbreak of war some mysterious women arrived—christened by our A.C.W.2 Mess and Kitchen "them potters." They disappeared at odd hours of the night into that holy of holies, the Ops. Room, and were singularly reticent about their work. We surmised, correctly, that a new trade had been opened for women, and they had been trusted with one of the State secrets. Other stories gradually filtered through to us, of balloon sites where a few men were to be seen and where women brewed tea for women in between behaving in a highly technical manner towards their balloon; of a cousin of one of us drivers who had a curious address on the East Coast, near no known station—and we prided ourselves in knowing every station listed or otherwise discovered in England.

Two Code and Cypher officers arrived and were viewed with interest and suspicion until we realized they were in direct substitution for R.A.F. officers and had little to do with us.

Many more of us arrived on our station and we acquired a Flight Officer—and quite a few new regulations. One of the telephonists was put on a charge and, divested of her hat, disappeared into i/c W.A.A.F.'s office to the tune of Left—Left and other remarks by the Flight Sergeant. It dawned on us that to lose or sell kit, to go into the Officers' Mess, or to appear improperly dressed, were sins, and that somewhere in the background was a book called K.R.—A.C.I., which had more and more effect on our lives. Terms like "Remustering" and "Reclassification" became household words and people began to appear who had been to a place called West Drayton—the W.A.A.F. Depot, women who had enrolled as clerks accounts, teleprinter operators, and even as electricians.

Although we did not realize that we were part of a force of 10,000, we were, in our conservative and rather patronizing way, proud of the obvious expansion. But finally we realized that we were no longer No. X Company and, in spite of a heated argument on the tarmac between an eminent Air Vice-Marshal and the C.O.'s chauffeuse—representing No. X Company—our regional organization was to be centralized at Air Ministry and we were now universally postable. We of the M.T. retaliated by a gallant but abortive attempt to take part in the Finnish Campaign, but we were unfortunately stopped twelve hours before we were due to drive our new lorries up to Newcastle. We had to content ourselves with retaining our overseas webbing equipment, or "winning it," as we expressed it, and digesting the pithy address on scales of kit which followed. Our vocabulary and our methods of providing ourselves with coal and other commodities were already completely integrated with the R.A.F.

DARK DAYS

Norway fell, Holland, Belgium and France followed. We captured an ancient blunderbus to keep us company on our frequent lonely trips down into the fens, and were given a short but to the point lecture on the Geneva Convention. "Them potters" acquired several rings round the eyes, the cooks learnt field cookery, and their chief became a messing N.C.O. and proudly took up a position in the Station Catering Office. Commissions and expansion became topics of conversation. The Battle of Britain was fought and won and we heard of the deeds and doings of the W.A.A.F. in 11 Group and were, for the first time, heartily sorry to be in 12 Group.

EXPANSION OF THE W.A.A.F.

After the Battle of Britain the foundation members of our station, having trembled before a board, bought new uniforms, and passed a course, were scattered to the four corners of the earth as A.S.Os. We felt that an era had passed and that sterner things lay ahead. And how right we were. The W.A.A.F., having proved itself in the Battle of Britain, was now on the full tide of expansion. April, 1941, saw the Defence (Women's Forces) Regulations. Now 30,000 strong, we were to be members of the armed forces of the Crown and were required to continue such service for the duration of the war unless released by the Air Council.

A very junior W.A.A.F. training officer sat with a wet towel round her head and visions of carefree days in the M.T. Section, and laboured over the crop of A.M.Os. which followed. Discipline—application of the A.F.A. and K.R. to women, reclassification, etc., "the standard for airwomen is to be that laid down for airmen."

Detailed rules for promotion of W.A.A.F. officers—"Duplication of administration is to be avoided"—"officers and airmen of the R.A.F. may be placed under the orders of officers and N.C.Os. of the W.A.A.F. if of higher relative rank."

The W.A.A.F. training officer's lectures included such things as C.T.T.B. 664B's., 848's, invaliding procedure, and through our courses for prospective N.C.Os. passed women with trades unknown in the old days. Flight mechanics, instrument repairers, charging board operators, photographers and wireless operators, mess stewards and R.T. operators. It was our job to fit them, not to deal with women only but to take their place in the exer-expanding war machine as fully fledged N.C.Os. responsible for superintending a part of a section, workshop or office. The W.A.A.F. were now not merely relieving men for other duties but, with fifty-four trades open to them, were an integral and vital part of the R.A.F. The first W.A.A.F. officers set sail for the East and the West, and women started talking knowledgeably about K.D. and places with glamorous foreign names.

At home, conscription for women was introduced and the force was reorganized from the top downwards—officers were posted on to the staffs of Air Ministry directorates in an executive capacity, the Staff Officers at Commands and Groups gradually substituted the "advisory" of W.A.O. into the "Staff" of W.S.O., and were regarded as specialists in women's administration.

W.A.A.F. officers appeared in many R.A.F. branches and in more and more responsible jobs. Many changes in the administration brought the policy of integration more and more to the fore. In 1943 we had reached our peak figure of 182,000, of whom 5,788 were officers, and by the end of that year 95 per cent. of the officers were employed in direct substitution for R.A.F. officers and 70 per cent. of the airwomen were working in skilled trades, and the W.A.A.F. formed 16 per cent. of the total R.A.F. strength. January, 1944, saw the sailing of the first draft of airwomen for the Middle East, and in October trooping of W.A.A.F. to India and the Far East commenced.

But enough of nostalgia—the pioneering and improvization of 1939-40. The grim and hard work of consolidation and expansion of 1941-42. The vast new fields opening up in 1943-44 and, finally, contraction and releases with all their never-to-be-forgotten difficulties.

Post-War and Integration

Now we are approaching an even keel. December will see the last of D.P.E. engagements and appointments, and we stand on the threshold of the permanent service for women —the Women's Royal Air Force.

The Secretary of State for Air in March, 1947, outlined the conditions of service in the permanent Service:

"We intend that they shall be an essential part of the Royal Air Force in time to come."

"We intend that women shall be properly incorporated in the Royal Air Force. We mean to employ them extensively in the same branches and trades as men. We mean them to be an integral part of the Royal Air Force. . . . the training . . . and qualifications required will be exactly the same as those for men. . . . There will be an outlet for pensionable service. . . . all must be ready to fly as passengers."

With the acceptance of women as a permanent integral part of the Royal Air Force we realize that we accept new responsibilities, for maintaining the traditions of the Royal Air Force, its etiquette and its service customs. The W.A.A.F. officer today has several years of that service tradition and experience behind her; she may be all out to prove that her job will not suffer through being in the hands of a woman—all the better for the job . . . but she realizes the place of the women's component in relation to the whole and intends that the future shall be a successful page in the history of the Royal Air Force.

Our Dominion Air Forces

ROYAL AUSTRALIAN AIR FORCE

Australian Aircraft Programme to be Expanded

AUSTRALIA'S aircraft-building programme, now employing well over 6,000, is to be expanded.

Two new British jet types are likely to be built as defence and attack aircraft, according to current reports.

Australia's aircraft-building programme has been generally based on British types, and already Rolls-Royce Nene jet engines are in production. Manufacture of Nenes would be expanded to supply not only the two military types now forecast, but also for Vampires already being built in Australia.

The jet planes suggested as the types likely to be built for the Royal Australian Air Force are the R.A.F. version of the Hawker N7 fighter and a twin-jet attack bomber, details of which have not yet been revealed by the British authorities.

The Hawker fighter would be built by the Commonwealth Aircraft Corporation, and the bomber by the Beaufort works of the Division of Aircraft Production—both at Fishermen's Bend, Melbourne.

Reports of the project were followed by comment that by the mooted adoption of these British types Australia would relegate to a secondary position the design and development of wholly Australian aircraft.

Two original design jobs, one for C.A.C. and the other for the De Havilland factory in Sydney, will be carried out in a secondary role. These will be for intermediate fighters—of the reconnaissance, radar search or some similar type.

It is believed that the jet programme would mean that the project for the building of ten Bristol Freighters would be suspended.

Australian-built Jets may better R.A.F.'s

Australian-built Vampire fighters equipped with Rolls-Royce Nene jet engines will probably have a better performance—particularly in the rate of climb—than the Vampire with which the Royal Air Force is equipped, according to Dr. E. J. Warlow-Davies, Chief Executive Engineer for sales and service with Rolls-Royce.

Dr. Warlow-Davies, an Australian by birth, went to Oxford in 1931. He is at present on his first visit to Australia for eighteen years.

He stated that De Havilland's, Sydney, had a free hand and if they accomplished what they set out to do the Australian Vampire would finish up as a faster aircraft with more all-round performance than the original.

The Goblin-powered Vampire of the R.A.F. is said to have a maximum continuous level speed of 531 m.p.h., and to be one of the most manœuvrable and fast-climbing fighters in service.

AWARD FOR EXCEPTIONAL GALLANTRY

The Stanhope Gold Medal, awarded by the Royal Humane Society to Group Captain Alexander, R.A.A.F., has recently been dispatched to His Majesty's Governor-General in Australia for presentation.

This award is of particular interest because although continuous annual awards have been made for a great number of years, this is the first occasion that it has been made to a serving officer of the Air Force.

The publication of this item of news will remind Commanding Officers of a source of rewards not covered by official distinction, yet which are sufficiently appreciated to warrant H.M. The King allowing the decoration to be worn in uniform. We are able to state that it was with the greatest pleasure that Admiral Sir Percy L. H. Noble, Chairman of the Society, and his committee, composed for the most part of officers of the Royal Navy and Royal Marines, were able to recommend the deserts of this gallant Air Force officer, and to note that the exploits of the air forces, while mainly in the air, are by no means restricted to that element.

This particular award was made by the Society for what their Annual General Court considered to be the greatest act of gallantry during 1944, it has been delayed until now owing to the Government's ban on the export of gold.

The Stanhope Medal was instituted to commemorate the services to the Royal Navy of Captain Chandos Scudamore Scudamore Stanhope, who died in 1871. The Royal Humane Society present this Gold Medal annually to the individual exhibiting the greatest gallantry during the year. The citation in this case reveals an exploit of exceptional gallantry and is recounted below.

CASE No. 58,467

GROUP CAPTAIN JAMES ALEXANDER, 37 R.A.A.F.

At 4.15 a.m. on the morning of 2nd September, 1944, Flight Sergeant Glynne B. Standring, R.A.F., and Sergeant Maurice K. Davis, R.A.F., and another were, owing to an impending gale, detailed to do emergency duty on a flying-boat moored in Plymouth Sound.

A gale of 65 miles per hour developed and a fishing vessel dragging her anchor and driven before the wind smashed into the nose and port mainplane of the aircraft.

In disengaging, the aircraft was damaged and a call for assistance was sent out. A pinnace set out, but owing to the abnormal conditions was unable to get near the aircraft. At 5.30 a.m. the crew were ordered to slip moorings, which was accomplished with great difficulty owing to buffeting by waves which were breaking over the cockpit. On leaving the buoy a second ship crashed into the starboard mainplane, collapsing the starboard float. To balance the plane the crew of three crawled out on to the port wing. The third man on the aircraft was washed away by a large wave and managed to reach the shore. It was now 6 a.m. and still very dark.

There were jagged rocks in the vicinity and Standring and Davis decided to jump into the sea in an attempt to reach the pinnace. They jumped, both wearing heavy clothing, Davis wearing an inflated "Mae West" and Standring being unable to inflate his. Visibility was practically nil, and after prevous strain both were in serious difficulties.

Group Captain Alexander, seeing this, jumped from the pinnace fully clad and wearing a deflated "Mae West," swam fifty yards, reaching Davis. Supporting him, he then swam to Standring and kept them both afloat until the pinnace manœuvred into position and picked them up in an extremely exhausted state.

The sea was confused with waves 8 ft. high. It was also pitch dark with heavy rain squalls. Rescue took place 120 yards off a rocky lee shore, the water being 17 ft. deep.

The Silver Medal was awarded to Group Captain James Alexander, Royal Australian Air Force, on 14th November, 1944.

The Stanhope Gold Medal was awarded to Group Captain James Alexander, Royal Australian Air Force, by the Annual General Court held on 13th March, 1945, for the best case reported during the year 1944.

THE MEDAL

OF THE ROYAL HUMANE SOCIETY

Obverse

HOC PRETIVM CIVE SERVATO TVLIT
VIT
OB SERV
D.D.
SOC.REG
HVM

Reverse

ROYAL CANADIAN AIR FORCE

SURVEY OF 1948

Looking back over 1948 we are pleased to see quite a few satisfying results of a reorganization and training programme set in motion two years ago. The year past saw the formation of new flying units, both operational and training, as well as the setting up of new ground training facilities. Flying time in 1948 was double that of 1947—a jump from 64,000 hours in 1947 to 113,000 hours in 1948.

Developments within the Service allowed the re-entry of several hundred wartime aircrew for flying duties. Our recruiting ceiling was lifted, and resulted in a steady increase in strength. By the end of 1948 the total strength was approximately 14,000 in contrast with 11,660 a year ago.

Progress in the construction of married quarters was good. During the past year 627 married quarters were constructed, bringing to 1,833 the number of married quarters in the Service, with an additional 800 at present under construction.

R.C.A.F. AUXILIARY GROWS

Addition of two more Auxiliary Squadrons in 1948 brought the total to ten, the two latest being in Calgary and London. Those previously activated include Montreal (2), Toronto, Hamilton, Winnipeg, Saskatoon, Edmonton and Vancouver. Also announced in 1948 was a special one-year training programme for Auxiliary aircrew. Selected Auxiliary members are given a year's training at the R.C.A.F. F.T.S., Centralia, Ontario, after which they receive pilot's wings and commissions. They then return to civilian life and carry on training with their Auxiliary Squadron. A similar plan for ground crew members of Auxiliary Squadrons is being explored.

FIRST WINGS PARADES

Flying training in the Regular Force went into top gear in 1948 and wings parades became a familiar sight. First groups of students, selected from high school graduates and from the ranks of serving airmen, received their wings. Basic pilot training is given at Centralia, while radio officers go to Clinton, the R.C.A.F. radar and communication centre. Navigators attend the Air Navigation School at Summerside, Prince Edward Island.

New double wings for all aircrew trades made their appearance during the year. These wings are similar in appearance to those worn by pilots.

Pilot and radio officer training was given to some seventy university undergraduates for the second consecutive year. The training scheme calls for selected university students to take aircrew training for three successive summers. On completion of their course they enter the R.C.A.F. Regular, Auxiliary or Reserve. Flying training was also given to Air Force Cadets from Royal Roads, the tri-Service cadet college, near Victoria, British Columbia.

Opened in 1948 was the Air Navigation School at Summerside. Specialist navigation courses for veteran aircrew began in the autumn and 1949 will see commencement of the first basic courses for navigators.

The Joint Air School at Rivers, Manitoba, swung into action, serving as a tri-Service establishment for instruction in air-ground warfare.

AIR TRANSPORT COMMAND FORMED

The status of the R.C.A.F. transport group was raised during the year and became Air Transport Command. Transport operations within Canada expanded, routine scheduled runs between R.C.A.F. stations by 426 and 435 Squadrons being increased to form a complex network from coast to coast and into the Arctic. Begun during the year was a series of special training flights across the Atlantic by 426 Squadron, with the aim of providing practical experience in operations of this nature to squadron crews.

R.A.F. SURVIVAL TRAINING SCHOOL

Latest R.C.A.F. establishment, and Air Force Survival Training School, is being set up at Fort Nelson, British Columbia, and Cambridge Bay, North-West Territory, to instruct aircrew in methods of bush and Arctic survival, it has been announced in Ottawa. The school, which will open this winter, will be staffed by experienced R.C.A.F. personnel and will include Eskimos and Indians on the instructional staff. Ultimate aim of the school is to train all R.C.A.F. aircrew actively engaged in northern flying in survival techniques.

Because of the hazardous terrain and rigorous climate encountered by R.C.A.F. crews, whose normal flights cover most of Canada's uninhabited areas, it was decided that survival training was essential for all aircrew. Case histories of forced landings in isolated areas show that in many cases lack of knowledge of self-preservation can result in undue hardships and often in needless fatalities. Survival in most cases depends on a specialized knowledge of the area of operation, and the school's aim is to provide this knowledge as a possible preventive measure.

The school's syllabus covers both Arctic and bush survival problems. Instruction is given in geography, first aid and medical care, use of emergency equipment and clothing, and shelter and rescue technique. Simulated forced landings and practical training in solving survival problems are part of the training. Trainees will also learn how to live off the sparse natural foods available in isolated areas. Because the average Eskimo speaks little or no English a course in basic Eskimo is included in the syllabus.

In charge of the school is Flying Officer R. J. Goodey, of Winnipeg and Chilliwack, British Columbia, who speaks a number of Eskimo and Indian dialects fluently. He will be assisted by experienced R.C.A.F. officers and N.C.Os., and a number of Eskimos and Indians will round out the instructional staff.

The school will also be used as a centre for testing and developing new types of clothing and emergency equipment.

CANADIAN SERVICES COLLEGES

In 1948 the Naval and Air Force College at Royal Roads and also the Royal Military College at Kingston became joint Services colleges with courses designed to train officer-cadets for the active and reserve forces of the Navy, Army and Air Force. The duration of the course at Royal Roads is two years and that of the Royal Military College is four. With the exception of the fourth year at Royal Military College, which has no summer term, each year consists of eleven months of instruction. The year is divided into three terms—fall, winter and summer.

"A POLICY FOR PEACE"

The Secretary of State for External Affairs, Mr. Pearson, delivered an address over the Trans-Canada network of the C.B.C., entitled "A Policy for Peace." He spoke of the "limitations" of the United Nations, caused, he said, by the members of the United Nations having fallen into two conflicting and suspicious groups, one of which was the Communist group led by Soviet Russia, which, he added, "does not wish to see the United Nations used in a manner which will promote a peaceful reconstruction of the free world." He then proceeded, in part, as follows:

"We must, however, make the best of this difficult situation. Sooner or later, if not on any basis of genuine friendship, at least on one of mutual toleration, the issues between the Western world and the U.S.S.R. may be reduced to the extent where genuine co-operation is possible. On our part, we must do nothing to hinder the arrival of that day. At the same time, let us not be deceived by those phoney olive branches which now seem to be waving here and there in Europe on orders from Moscow. Communism is never so dangerous as when it begins to appease. Let us not forget that while Communists change their tactics, their deadly strategy of revolution is fixed and permanent. Their own leaders have made that clear by their own words, designed to be read not by a gullible public abroad but by their own people at home.

"Our foreign policy, then, must be based on the realities and dangers of the existing situation. One of these is the Communist menace. Another is the fact that we cannot now rely on the Security Council of the United Nations to take effective action to deal with serious threats to the peace or major acts of aggression from the only source from which they are likely to come. Without sacrificing our long-term objectives, therefore, we must take other means to deal with the immediate position. This is why the Canadian Government has given its full support to the discussions which are now taking place regarding a North Atlantic Pact. . ."

WORLD WAR PRIZE MONEY

The Government will put before Parliament a proposal by the Royal Canadian Navy and the Royal Canadian Air Force that prize money from the Second World War be placed in the Canadian Naval Service and R.C.A.F. Benevolent Funds, it was announced by the Minister of National Defence, Mr. Claxton, on 28th January.

Distribution of prize money is based on an agreement between the nations of the Commonwealth by which the proceeds of all prizes taken during the war would be put in a common pool and allocated to the nations on a basis of comparative military strengths. Because they had to do with sea captures, the Air Forces of the Commonwealth are participating as well as the Naval Forces.

The total amount available to Canada has not yet been determined. The Navy's share will be two-thirds of the allocation and the remaining one-third will go to the Royal Canadian Air Force.

The Navy and Air Force Benevolent Funds are organizations devoted to the relief of distress among active and reserve personnel and their dependants and payment of these sums will enable the Funds to expand the scope of their activities and ensure their operation for many more years.

ATOMIC POWER

The following is an excerpt from the speech of Dr. O. M. Solandt, Chairman of the Defence Research Board, before the Royal Canadian Institute, at Toronto:

"The harnessing of atomic power for industrial use is the goal of a great deal of work throughout the world, but it is generally agreed by the experts that the goal will not be achieved for some time. In addition to the many technical problems that must be solved, there is still a world shortage of nuclear fuels. It seems likely that the time will come when a major part of the world's power will come from atomic fission. It may be that none of us will live to see that day, even though the experimental production of power is achieved within the next few years. However, we may well see the first large ship powered by an atomic motor and even a few atomic power plants in remote areas where fuel costs are now very high.

"One of the difficulties in the way of developing atomic power that is sometimes overlooked is that the basic processes and equipment needed for making atomic bombs and atomic power are almost the same. A major atomic power plant could be quickly converted to make bombs. Hence atomic power can never be fully dissociated from atomic warfare. If we are to have free and rapid development of the possibilities of atomic power we must have full international control of atomic fuels and reactors. This will involve some sacrifice of national sovereignty, but that is not a high price to pay for peace. Canada has already played a leading part in the endeavours of the United Nations Atomic Energy Commission to attain international control and has indicated her willingness to make this sacrifice as a contribution to world stability and order."

BENEVOLENT FUNDS

R.A.F. QUARTERLY contributions to the Benevolent Funds of the Commonwealth and Empire Forces for the

APRIL, 1949, HALF-YEAR

		£ s. d.
The Journal's Donation		42 10 0
		£42 10 0
R.A.F. Benevolent Fund	£28 10 0	
R.C.A.F. Benevolent Fund	7 0 0	
R.A.A.F. Benevolent Fund	5 0 0	
R.N.Z.A.F. Benevolent Fund	4 0 0	
S.A.A.F. Benevolent Fund	4 0 0	
		42 10 0
Brought forward		964 15 10
Grand total contributed to date		£1007 5 10

The Air Forces in Parliament

THE AIR ESTIMATES

LET us be frank and admit that the speech on the Air Estimates by the Secretary of State for Air was a bitter disappointment to us all. What did we expect?

Our expectations were based on the need to lose no time in remedying the unsatisfactory state of affairs in our first line of defence, so that it would be strong enough to resist the first onslaught of Russia, should we be called upon to do so at any time in the near future.

We shall not endanger that newly-expressed desire for great security by being more precise as to which of our particular hopes have not been fulfilled.

Firstly, we hoped to hear that the Government had a plan to remedy the unsatisfactory manpower situation. It has been their declared policy for some time *that the highest possible proportion of the strength of the R.A.F. should consist of Regulars.* Of the total strength of 228,000, only 126,000 are Regulars, and of these only 20,000 were serving in 1939. The present lack of experienced airmen cannot even be assessed by these figures, as deductions must be made from the Regulars of unskilled trades which cannot be counterbalanced by the National Service men as they are not old enough to have gained the necessary experience. It is clear and admitted openly that our first line of defence is seriously handicapped by the lack of experienced men in certain highly-skilled trades.

The omission of a detailed plan to remedy this fundamental need, upon which all other plans must succeed or fail, was conspicuous by its absence.

Secondly, realizing that our defence largely depends upon an adequate number of bomber squadrons armed with the latest aircraft and equipment, we hoped to hear (owing to the nearness of the danger which threatens us), that by the end of this year or early in 1950 our bomber striking forces would be of a size, shape and quality which would deter any would-be aggressor. We were left guessing as to how far this need was being met. All we did hear was that "we have had under development a twin-jet bomber, capable of a speed approaching 500 m.p.h., and that it has now been decided to place orders for its production."

Thirdly, and equally as urgent as the need for an adequate bomber force, we hoped to hear that the present number of jet fighter squadrons would be doubled and that action was being taken to ensure that *they would all be up to their full establishment* in airmen of adequate experience and the latest type of aircraft by early 1950.

We should have looked upon this as an acknowledgment of the urgency of our needs.

Again, we were disappointed by the seeming half-measures that were proposed. Such disappointment might have been lessened slightly by the announcement that "we are doubling the *strength* of Fighter Command's jet fighter force" had we not known the subtle Service difference between "establishment" and "strength." That our fighter squadrons have been in "strength" below their proper "establishment" (i.e., the numbers they should have) is well known. Therefore, we could not assume from this that our hopes expressed above were being realized.

Fourthly, to build up our patched-up Royal Air Force into a contented, keen and highly-efficient first line of defence we hoped to see a request for at least £30 million increase to the original estimates for 1948-49.

The increase contained in the £207½ million asked for was only £18 million net increase. This was as disappointing as the £4 million sanctioned for increases in pay and marriage allowances, granted last November, no small part of which goes back to the Government in tax. Having dealt more fully elsewhere with the need to raise the increment of members of the Air Force to that more favourably comparable with their comrades in industry, it is not proposed to elaborate on this here.

We cannot but express our bitter disappointment generally in what seems to be lack of adequate plans and absence of any declaration of urgent action it is proposed to take to remedy our weaknesses in our first line of defence.

THE ATLANTIC PACT

Although we go to press early in March, in order to issue this number early in April, it seems clear already that the Atlantic Pact will be signed very shortly.

Our Government has expressed an earnest wish to participate, and we feel sure that all Powers concerned will sign at an early date. Norway and Denmark are likely to be added, but at present it is not clear whether Italy, Sweden, Portugal and Spain will become part of this defensive alliance. The reluctance of Sweden and Italy to commit themselves to an alliance with a group of Powers which might at any time find itself in conflict with Russia is easily understood when their geographical position on Russia's doorstep is taken into consideration. But the possibility of their remaining neutral in the event of such a conflict is very doubtful; and, as Democratic States, they would not wish to join the Soviet Union. Moreover, the U.S.A. has announced that she is not prepared to send supplies of war material to any nation that will not sign the Atlantic Pact.

It must also be recognized and remembered that, by her constitution, the United States cannot, in peace time, enter into any alliance which might involve her in war, the sole right of Congress to decide whether or not to embark upon war being reserved absolutely.

We are fully aware of the aid that America could give us as a signatory of the Atlantic Pact, but this in no way detracts from our observations under the preceding paragraph "Air Estimates." We are sure that America will be equally disappointed in our lack of action in hastily building up our first line of defence. The new alliance still leaves us this grave responsibility which, if fully met, would enable us to withstand the first onslaught by Russia, and should it come, it will undoubtedly be without warning, and there will be no "phoney war" this time to give us breathing space to repair past omissions. By adequate action now we should be removing a temptation for such an act of aggression and add greatly to our hopes of peace for some time to come.

STRENGTHS OF THE ARMED FORCES

The Minister of Defence (Mr. A. V. Alexander), in a written answer to a question on 7th December, 1948, announced that the estimated strengths of the Armed Forces on 1st January, 1949, were as shown in the following table:

Estimated Strengths of the Armed Forces of the United Kingdom on 1st January, 1949 (Thousands)

Service	Regulars	N/S Men	Women	Total
Royal Navy	118	19	7.5	144.5
Army ...	180	237	12.0	429
R.A.F. ...	112	111	14.0	237
All Services	410	367	33.5	810.5

The estimated net reduction during 1948 was 310,000.

(*"Hansard,"* *H. of C.*, 7/12/48, *Col.* 38.)

MARRIED QUARTERS

In reply to a question on 15th December, 1948, the Under-Secretary of State for Air (Mr. Geoffrey de Freitas) said that there were, in the United Kingdom, 1,240 married quarters for officers and 6,700 for airmen. Altogether about twenty-five were unoccupied and awaiting repair. 430 married quarters for officers and 2,100 for airmen were under construction.

(*"Hansard,"* *H. of C.*, 15/12/48, *Col.* 1197.)

AIR SURVEY WORK

In reply to a question on 15th December, 1948, the Under-Secretary of State for Air said that the four photographic reconnaissance squadrons of the Royal Air Force employed on air survey work for the civil departments would be required in war for photographic intelligences and survey duties and the work they were doing provided them with valuable peace-time training.

(*"Hansard,"* *H. of C.*, 15/12/48, *Col.* 1201.)

EDUCATION IN THE ARMED FORCES

In response to a request for a statement on the arrangements for liaison between Service and civilian educational authorities in view of the dissolution of the Central Advisory Council for Adult Education in His Majesty's Forces, the Minister of Defence (Mr. A. V. Alexander) said in a written answer that the Central Advisory Council had been created as a wartime organization at the end of 1939 in order to put men and women in His Majesty's Forces into touch with the educational resources of the country. All three Services wished to make the fullest possible use of the help which civilian education could afford to them. Since the end of the war the three Services had decided to establish advisory bodies whose members would be representative of a wide of educational interests.

The administrative and executive functions of the Central Advisory Council would be transferred to a small central committee to be called the Central Committee for Adult Education in His Majesty's Forces. That committee consisted of representatives of the Service and Education Departments, the extra-mural departments of the universities, the local education authorities and the voluntary bodies interested in adult education. It would co-ordinate the provision of civilian assistance to Services' education and administer the financial arrangements for that assistance. The work hitherto carried on by the regional committees of the Council would be transferred to the universities.

The new arrangements would preserve and strengthen the close co-operation between civilian and Services' education which had been established during the war years and the Government looked forward to developing in the future, by this means, the relations between the various organizations and interests concerned with further civilian education for the benefit of the men and women in His Majesty's Forces.

(*"Hansard," H. of C.*, 17/12/48, *Cols.* 219 & 220.)

ORGANIZATION AND EFFICIENCY OF THE ROYAL AIR FORCE

On 20th January, 1949, on the motion for the adjournment in the House of Commons, Air Commodore Harvey (M.P. for Macclesfield) raised the question of the organization and efficiency of the Royal Air Force, in a well-informed and closely reasoned speech.

Air Commodore Harvey began by hoping that the Secretary of State for Air was feeling none the worse for his experiences of the previous day (when he had been subjected to a long series of searching questions concerning the air reconnaissances near the Palestine-Egyptian border). He pointed out that there was real disquiet in the country at the moment, both among those who were in the Royal Air Force and among the civilians at large. Fortunately, he said, they still remembered only too well that the Royal Air Force was the first line of defence of this country, and if it had not been for a small number of men and one particular Command in 1940, they (Hon. Members) would not have been there today discussing the Service.

CONSCRIPTION

Conscription on the present basis, proceeded Air Commodore Harvey, would not suit the Royal Air Force. Eighteen months' service was not of real value. He did not see how they could have an efficient Service with fifty per cent. of the men serving for that short space of time. He would ask the Secretary of State to fight the battle for the Air Force with the Cabinet and to see if he could get preferential treatment for that particular Service. Lord Douglas had said quite recently that unless something was done for the Royal Air Force it would die on its feet.

DISCIPLINE

He next referred to the discipline in the Royal Air Force. They recognized that over the last twenty or thirty years the method of discipline had changed considerably, "and a very good thing too." But they had now gone to the other extreme. What they wanted was a proper discipline which was fair to the individual and to the Service. When they saw officers and airmen walking about their towns with their caps stuck on the side of their heads, with their coats undone and grease round the collar, he wondered how parents were going to look up to the Service and say, "That is what I want my boy to go into." He believed it would be all to the good for the Royal Air Force to insist on smartness to achieve something of which they could be really proud.

OPERATION "SUNRISE"

Referring to Operation "Sunrise," Air Commodore Harvey thought that the Air Force had been badly treated in the Press. He regretted that the public relations branch of the Air Ministry had not got out a snap statement giving the Air Force point of view. He further suggested that the public relations department might make more use of their own paper, the "Royal Air Force Review." He also thought that the B.B.C. could render more assistance to the Royal Air Force.

LEADERSHIP AND MORALE

Turning to the question of leadership and morale, he said that, in his view, there was no doubt that the Air Force today was deficient in leadership. That, he thought, was due mainly to organization. The Service was split into three divisions: flying, administrative and technical. That was known as the "three-prong system." There was a certain amount to commend the system because there was a saving in man-hours; but, generally speaking, there were definite drawbacks.

The first was that on a bomber or fighter station, two-thirds of the men on the station came under the command of non-combatant officers who never sat in an aeroplane in any capacity, except perhaps to test some piece of equipment. He thought that that was entirely wrong. In a fighting Service the men, in the main, ought to be commanded by men who know their business of flying aeroplanes. He had no doubt that the technical officers were extremely good at their jobs, but nevertheless they were not aviators; and he believed the men would react much more favourably if they were commanded by combatant officers, the men who did the fighting.

The second point was that the Royal Air Force was so constituted that the technical branches shared to a very large extent the responsibility for the Service. The general duties officer, the pilot, got very little experience at all at command in his early days in the Service. The general duties officers were the men who would be the future Chiefs of the Air Staff and would fill most of the senior posts at the Air Ministry and on the Air Council. It seemed most unfortunate that they should not get opportunities to command in their early years.

It was most important that the atmosphere of flying should permeate throughout the whole Service. They would get that atmosphere if they had larger squadrons. Every airman liked to think that he belonged to a famous squadron. The squadrons, in time of peace, should be expanded, even at the expense of centralization. He believed that there was too much over-centralization in the R.A.F. and it was unquestionably bad for morale.

There were, he continued, too many branches in the Air Force. For example, there were the provost, catering, physical fitness and marine branches. Many of those jobs could be done by general duties officers. A man who was off flying for a limited period could well be taught another branch of the Service. Furthermore, those branches might be called backwaters because they offered only a limited career to the men who joined them.

The Royal Air Force Regiment

Air Commodore Harvey then said: "I cannot, for the life of me, see what are the functions of the R.A.F. Regiment." He was prepared to believe that the Regiment did an extremely good job in carrying out its duties in many parts of the world, but he suggested that it was a task which ought to be undertaken entirely by the Army. Certainly, he said, it was not the job of the Royal Air Force to train troops on the ground for the defence of aerodromes. In his view, that was extravagant and expensive.

Pay and Promotion

Turning to the subject of pay, he said that the recent concessions were better than nothing; but the officers were horrified when they heard of that increase. They had expected something better. If the Minister of Defence had given them their 6s. a day allowance free of income tax, he would have had a good reception. No one was more hard up today than the middle class professional man in all walks of life, in particular in the R.A.F. The pay was virtually the same as it was fifteen or twenty years ago. Many of those men were worried to death about their budgets, and what had been given would be no real assistance. There was also considerable dissatisfaction in the Air Force about the allocation of married quarters; and he asked the Secretary of State to inquire into the matter and to see whether he could do something to make the system more fair.

As a final suggestion, Air Commodore Harvey said that the time had come for some of the more senior officers to retire and make way for younger men. They wanted men of the middle forties to accept the highest commands, men who could fly aeroplanes, who could set the right spirit and who had themselves graduated through the Staff Colleges.

Flying and Morale

Wing Commander Millington (M.P. for Chelmsford) continued the debate and spoke about the purpose of flying and the function of the Royal Air Force in relation to flying. After expatiating on the æsthetic thrills connected with flying modern aircraft, he suggested that the whole of the organization of the Royal Air Force today should have only one purpose; and that was that as many aircraft and as many airmen as possible should be put into the air for the purpose of completing their training during non-operational periods, so that they would have a nation of men trained to a true appreciation of the instrument which modern science had put into their hands and capable of using it most competently.

He believed that a great injustice was done to the Service when they had a concentration of emphasis upon maladministration, upon low morale and on all the dreariness of which they read in the newspapers. He believed that there had been a progressive building-up of morale since the first post-war run-down had been completed. He agreed with the Hon. and Gallant Member for Macclesfield that there was something wrong with the relationship between flying formations and ground formations.

Wing Commander Millington concluded by saying that he had no fear about the spirit and the morale of the Royal Air Force. What was needed was a little more close appreciation of what the man on the spot was feeling, a little more appreciation of the fact that the individual airman did not quite feel part of the whole thing, that he did not quite feel that he had a specific officer looking after his interests.

Public Relations

Squadron Leader Kinghorn (M.P. for Great Yarmouth) regretted that more was not being done to inform the public of the magnificent work being done now by the Royal Air Force on the Berlin Air lift and in Malaya; and also to explain to the public, who probably had a false impression, that it was really the weather which had prevented the Air Force from carrying out its proper task in Operation "Sunrise." He also put forward the view that all young folk in Britain ought to be made as air-minded as they had been made sea-minded by the chance of history.

The Secretary of State's Reply

Replying to the debate, the Secretary of State for Air (Mr. Arthur Henderson) said that he was grateful to the Hon. and Gallant Member for Macclesfield for raising those matters. Referring to the suggestion that conscription would never suit the Royal Air Force, he admitted that the effective strength of the R.A.F. was at present lower than the figures of its strength might suggest, because the average level of experience was very low, because there was a serious lack of balance between the trades, and because the proportion of men in training at present was very high. While they were building up the hard core of Regulars, therefore, the National Service man was indispensable. In the past the National Service men, owing to their length of service, had often been as valuable as the Regular airman.

To illustrate the attraction which the Royal Air Force still had for the youth of the country, he stated that in December last 22,000 young men had opted for the Royal Air Force out of 59,000 called up. Nevertheless it was their policy that the highest possible proportion of the strength of the Royal Air Force should consist of Regulars; and the present rate of recruiting exceeded anything which they had achieved before the war.

Public Relations

Defending the information (i.e., public relations) department, Mr. Henderson said that he had usually found that department extremely efficient; neither had he any complaint to make about the newspapers. Broadly speaking, the newspapers had adequately published the statements which had been issued by the Air Ministry giving the Air Ministry's explanations of what took place during Operation "Sunrise." It might well be that a good deal of material was put out through the information department, but it was for the newspapers to decide to what extent they would publish it.

The subject of frequent postings had given him (the Secretary of State) a great deal of anxiety, but to some extent re-postings had been inevitable owing to the run-down of personnel.

With regard to the criticism of present leadership in the R.A.F. and to the need for opportunities for youth, he could say that, as a beginning they had just appointed one of the most brilliant fighter-leaders of the war as Commander-in-Chief Fighter Command at the age of 46.

Morale

The Secretary of State admitted that the standards of morale in the Royal Air Force were not entirely satisfactory at present and he attributed that to the following facts. During the war there had been an acute shortage of officers and airmen with pre-war experience, and general duties officers had then had very little time to devote to the welfare of the ground airmen. Morale, he said, depended upon the way the personnel were looked after. That did not mean bedroom lamps or taking the men breakfast in bed; it just meant giving them reasonable living conditions, reasonable prospects of a career and the assurance and feeling that they were being treated as human beings and not merely as machines. In accordance with instructions issued by the Air Council at the end of 1946, specific training in "man-management" was given during officer training.

Turning next to the three-prong system, Mr. Henderson said that centralized servicing was not a new departure; it had only been carried a little further to save skilled man-power; and they could not put the clock back. The three-prong system was a recognition of the fact that the responsibilities of the R.A.F. Commander lay in three main fields: flying, administration and servicing.

The R.A.F. Regiment

There might be, he continued, two views about the R.A.F. Regiment. The primary and most important task of the Regiment was to work out and keep alive the technique of airfield defence—infiltration, saboteurs, air attack by parachutists. Therefore they sought to do two things: to provide an Armed Force which would have the responsibility of providing for the defence of airfields, and also to provide skilled instructors to train the R.A.F. as a whole in ground combat. The strength of the R.A.F. Regiment at the moment was only two and a half per cent. of the strength of the whole Royal Air Force.

In conclusion, the Secretary of State expressed his belief that the spirit of the officers and men was extremely good, that the morale throughout the Service as a whole was good, and that there was still a great deal of pride throughout all ranks of the Royal Air Force and a feeling that they were well able and willing to maintain the great traditions of the Royal Air Force of the past.

(*"Hansard," H. of C.*, 20/1/49, *Cols.* 382-419.)

Sport in the R.A.F.

TWO R.A.F. YACHT CLUBS IN FAR EAST REGATTA

An event of unusal interest to the Royal Air Force in the Far East was the third annual regatta of the R.A.F. Changi Yacht Club. The R.A.F. Yacht Club at Seletar and civilian yacht clubs in Singapore and Johore also took part and ninety-four boats of all classes competed.

The regatta was held at Changi, headquarters of Air Command, Far East, and among those steering their own boats were the Commander-in-Chief, Air Marshal Sir Hugh P. Lloyd, and Lady Lloyd, their daughter, Miss Lloyd, Air Vice-Marshal J. F. W. Mellersh (Air Officer in Charge of Administration at H.Q., A.C.F.E.) and Miss G. Inglis, daughter of the Commodore of the Club, Air Vice-Marshal F. F. Inglis.

The Seletar crews were headed by Group Captain R. B. Harrison, Commanding Officer of the Technical Wing at R.A.F. Maintenance Base (Far East), Seletar.

Airmen, as well as officers, were well represented among the competitors and the principal event, an all-comers' race on a three-and-a-half-mile handicap, in which there were over eighty entrants, was won by a sergeant from the Seletar Club.

The R.A.F. Changi Yacht Club was founded in February, 1946, to provide facilities for sailing, motor-boating and small boat racing for all ranks of all Services within the Changi encampment. It is affiliated to the Yacht Racing Association of Great Britain and to the Royal Air Force Yacht Club, and has a membership of 180.

In August, 1947, the Club suffered a serious setback when the main boathouse was demolished by a storm and many of the boats were damaged. A successful recovery was made, however, and 1948 saw the main boathouse not only rebuilt but enlarged, and a new Club building erected, with changing rooms and showers.

1,000 SAILING ENTHUSIASTS IN R.A.F.

There are some 1,000 known sailing enthusiasts in the Home Commands of the Royal Air Force, whose interests are now to be catered for by the R.A.F. Sailing Association, which has recently been formed, with Air Commodore A. W. B. McDonald, who was a representative of Great Britain in the yachting events in last year's Olympic Games, as Commodore.

A number of R.A.F. stations already have their own sailing clubs and these will be affiliated to the Association. The formation of clubs at other stations will be encouraged and the Association hopes to be able to help in the purchase of boats.

The Association will promote racing and an annual championship meeting. A burgee (a broad swallow-tailed pennant) is to be designed for use by affiliated clubs, and each will design its own square racing flag.

Representatives of each Home Command of the R.A.F., and of No. 90 Group, have been chosen to serve on the Committee and Squadron Leader L. M. Hodges, Air Ministry, Whitehall, is Honorary Secretary.

R.A.F. MOUNTAINEERING ASSOCIATION

The R.A.F. Mountaineering Association, with the approval and co-operation of the R.A.F. Winter Sports Association, held a winter sports meet at Glenmore Lodge, Aviemore, Inverness, from 5th March to 12th March, which is the best period of the year for ski-ing. The mountains rise to 4,000 feet just behind the lodge and last year's ski-ing there was almost up to Alpine standard. A summer meet is planned in the French Alps. Other climbing meets will be held in Wales and the Lake District. This Association has increased its membership from nineteen to seventy-five in its first year.

More ambitious plans are contemplated as the members gain in experience and the idea of one day arranging an expedition to the Himalayas was put forward at the recent annual meeting by Mr. Frank Smythe, the well-known authority on mountaineering, who is a Vice-President of the Association.

HUNTING

Providing sufficient entries are received, the R.A.F. and R.A.F. Hunt Club race will be held at the Blankney point-to-point meeting at Boothby, Graffoe, on Saturday, 23rd April. First race will be at 2 p.m. As this race has now been extended to past as well as present members of the R.A.F. there should be a good number of entries.

In past years the undermentioned cups have usually been competed for in one race:

The Cranwell (R.A.F.) Hunt Club Cup.

The R.A.F. Light-weight Cup.

The R.A.F. Novices' Cup.

We still vividly remember the year when there was a most exciting finish, fought out by Air Chief Marshal Sir Arthur M. Longmore, G.C.B., D.S.O. (who was then the Air Officer Commanding Cranwell) and Air Commodore R. H. Verney, C.B.E. (then Officer Commanding Electric and Wireless School, Cranwell), and the latter, on "Harrieta," winning by a short head.

ROWING IN THE ROYAL AIR FORCE

There must always have been in the Service a number of experienced oarsmen who have wished that they could carry on their favourite sports on a Service basis and have dreamed of the formation of representative Royal Air Force crews to compete in open regattas. Others with no experience must have been thrilled by the sight of a well-trained crew in action—must have admired the perfection of craftsmanship displayed in racing boats and oars, and envied and wished to emulate the skill and grace of accomplished oarsmen. All these must have been disappointed that the Service offered them no facilities. Rowing is, of course, an institution at Cranwell, but hitherto it has not been one of the traditional or recognized sports of the Royal Air Force.

Many keen oarsmen have, no doubt, toyed with the idea of organizing rowing in the R.A.F. and been finally deterred by the difficulties involved. Rowing is exacting in its requirements; not every station is on or near a suitable stretch of water; and boats and oars are expensive. How could such a sport be established widely enough to secure official recognition? And how could a crew be kept together long enough to train to a standard fit to represent the Service?

Early in 1947 a small company of enthusiasts met in the Air Ministry and decided that obvious and great though the difficulties were they were not insuperable. So, on 29th March, 1947, with the encouragement and active support of the R.A.F. Sports Board, the Royal Air Force Rowing Association was formed with Wing Commander J. R. Embling as Chairman. In June, to comply with the rules of the Amateur Rowing Association, the name was changed to the Royal Air Force Rowing Club. The objects of the Club are to further the sport of rowing in the Service and to raise representative Service crews to compete in Amateur Rowing Association regattas. Membership is open to individuals of all ranks, or to stations.

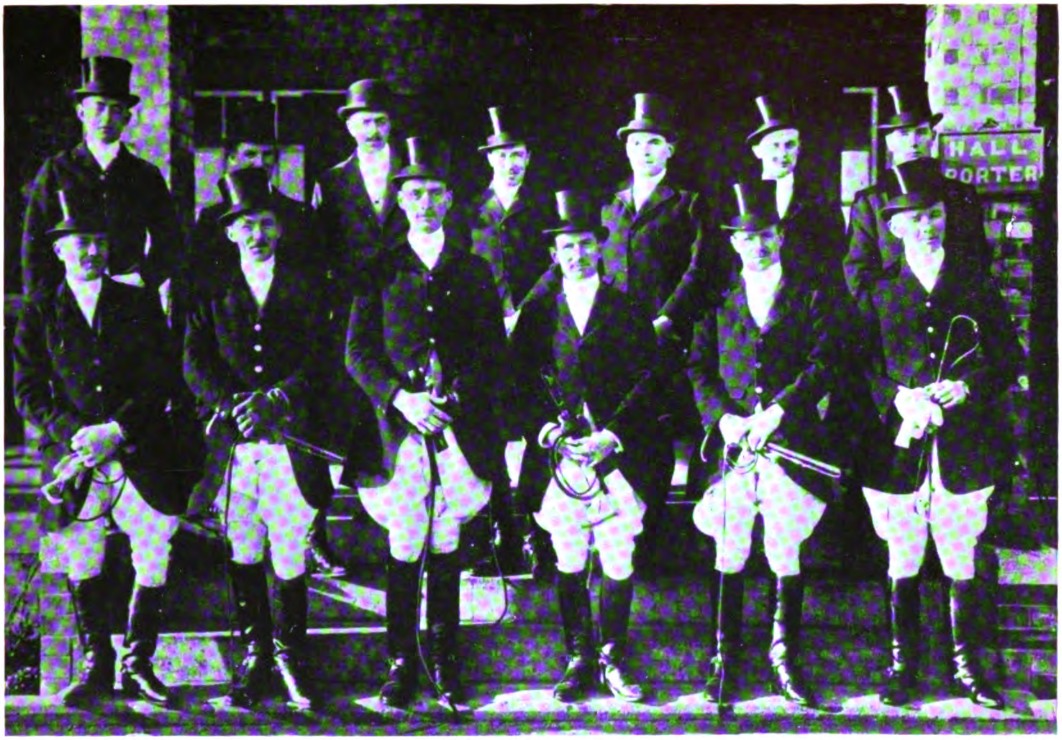
In its first season the Club was not able to raise or train a crew in time for Henley Royal Regatta, but trials were held at Oxford, and an eight was picked to compete at Maidenhead and Henley Town regattas. On both these occasions the R.A.F. met the powerful and experienced Henley Rowing Club crew in the first round and lost by a small margin. The first Royal Air Force Regatta was held at Kingston in September, and was honoured by the presence of the Chief of the Air Staff and Lady Tedder.

In the winter of 1947 the plans were made for the Club's first full season, the climax of which was to be the representation of the Royal Air Force at Henley Royal Regatta, the foremost rowing event in the world. A new boat and oars were purchased, block membership of the London Rowing Club was arranged, and a crew began regular weekend practice at Putney for the Head of the River race. This event was rowed from Mortlake to Putney in March, 1948. The R.A.F. crew started 92nd and finished 25th, well up among first-class crews from universities and from old-established clubs. In the meantime, rowing had been organized on a number of stations, liaisons had been formed with local clubs and individual oarsmen from all over the country had been writing to express their enthusiasm and offer their support. The crew for the Head had been recruited from those within practical reach of London; and while it had gained invaluable experience, it was not truly representative of the Service, nor was it necessarily the best crew that could be mustered. Accordingly, to provide the widest possible field for choice and to give all potential candidates a fair chance of selection, the R.A.F. Regatta was held in the spring and was followed immediately by trials for the selection of the Henley crews.

The regatta took place at Kingston on 15th May. Entries were made for sculls and fours from a number of stations, and oarsmen came from far afield to take part in the scratch eights. Headquarters, No. 90 Group, and Cranwell each had a most successful day. It was encouraging to note that the winners in all the sculling events were airmen.

The next morning a large number of oarsmen went through their paces before a selection committee presided over by Air Marshal Livingstone, a former Cambridge Blue, who is President of the Club. Eventually the field was narrowed to the chosen thirteen, who were to provide an eight for the Thames Cup, a four for the Wyfold Cup and a spare man.

At the end of May, thirteen oarsmen and a



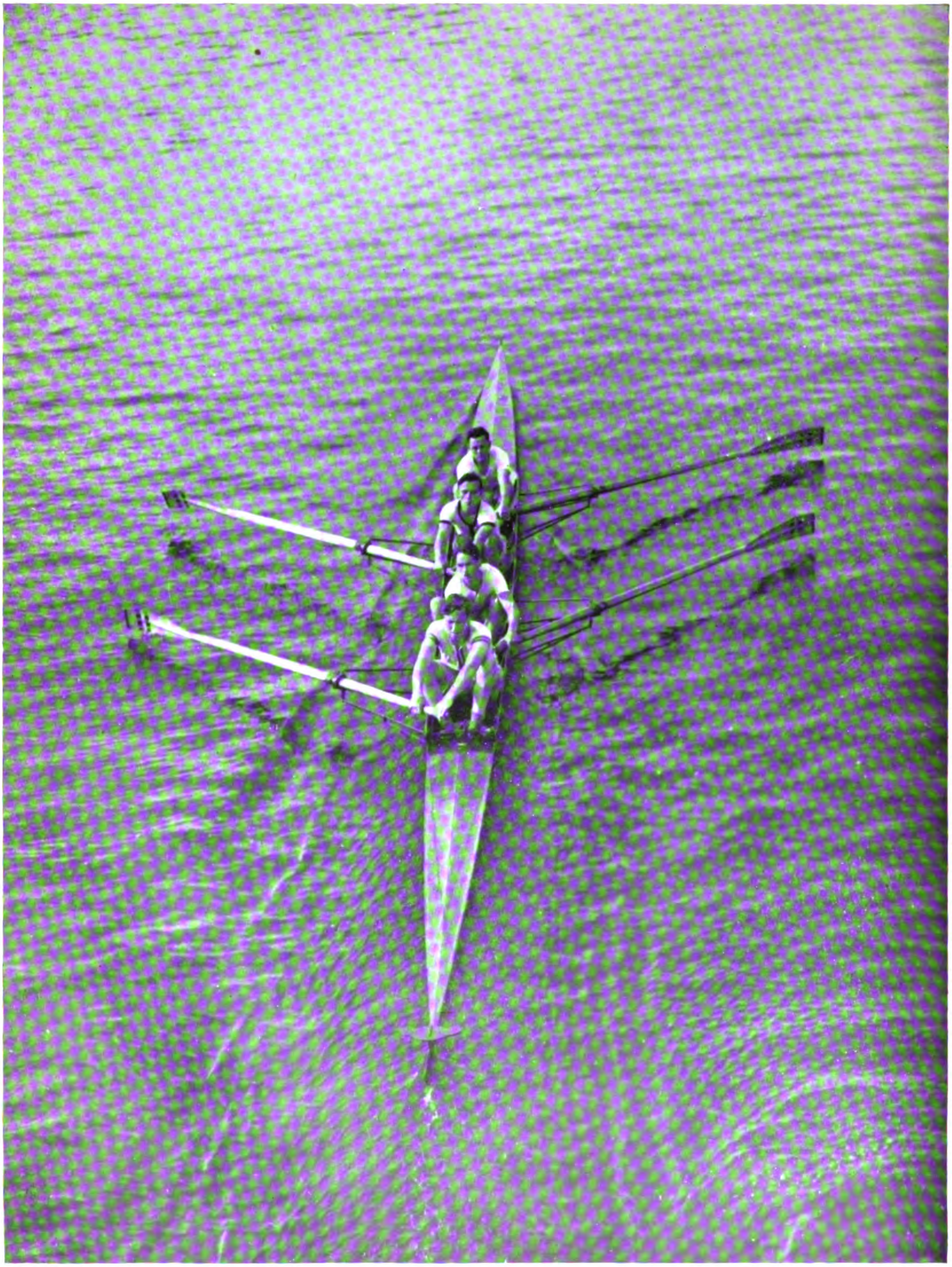
LOOKING BACKWARDS, 1920, THE CRANWELL HUNT CLUB

This group of an R.A.F. Sporting Organization as it was nearly 30 years ago shows many famous officers serving in those days. If young officers of today compete against any of these old sportsmen at the Blankney Point-to-Point on 23rd April, they will have to ride a hard race.

Back Row.—F./Lt. P. Huskinson, M.C. (now A./Comdr. ret.). 2/Lt. R. H. Hanmer, M.C. (now G./Capt. ret.). W./Comdr. A. S. Barratt, M.C. (now Air Chief Marshal Sir Arthur Barratt, K.C.B., C.M.G., M.C., ret.). F./Lt. J. C. Leacroft, M.C. (now G./Capt. ret.). F./Lt. Jones Williams, M.C. (killed on long distance record attempt). F./Lt. J. B. Cole Hamilton (G./Capt. decd.). F./Lt. W. B. Farrington, D.S.O. (G./Capt. ret.).

Front Row.—G./Capt. A. M. Longmore (now Air Chief Marshal Sir A. M. Longmore, G.C.B., D.S.O., ret.). W./Comdr. A. L. Godman, C.M.G. (now A./Comdr. ret.). A./Comdr. C. A. H. Longcroft, C.M.G., D.S.O., A.F.C. (now Air Vice-Marshal Sir Charles A. H. Longcroft, K.C.B., C.M.G., D.S.O., A.F.C., ret.). W./Comdr. C. F. Kilner, D.S.O., decd. S./Ldr. A. James (now W./Comdr. ret.). S./Ldr. R. H. Verney, O.B.E. (now A./Comdr. ret.).

The Old Berkley Meet at the Joint Services Staff College



[*Photo by Bushell's of Henley*

THE R.A.F. FOUR AT HENLEY ROYAL REGATTA

coxswain, of all ranks from Wing Commander to Aircraftman, who this time at least had no complaint against the edict of "P" Staff and Records, arrived at Medmenham, and under the leadership of the captain, Wing Commander K. V. Garside, a former Oxford Blue, training began in earnest. For their part, Headquarters, No. 90 Group, raised only the mildest of eyebrows at this mysterious increase in their strength; cookhouse staffs and mess waitresses, amazed and amused, tolerantly did their best to assuage the apparently insatiable appetites of the rowing men.

To save money on transport and to gain experience, the eight rowed their boat up from Putney to Marlow, staging at Kingston and Staines. This was hard work but proved an excellent method of "shaking down." The four used a boat kindly lent by the Marlow Rowing Club. Both crews trained on the Marlow reach for the first week, carrying out two outings a day. Wing Commander F. E. Hellyer, the old Cambridge Blue, who had been coaching the Olympic Eight, was in charge of the work of both crews.

The towpath at Marlow proved unsuitable for coaching, and launch-hire was expensive, so as soon as possible the crews rowed up to Henley and continued training on the Henley reach. During this time the four had expert advice from Antony Rowe, the Oxford President, A. J. R. Purcell, the Oxford stroke, and W. G. R. M. Laurie, the Olympic oarsman, besides a good deal of less expert and not always unanimous advice from within the boat.

On 12th June both crews competed at Reading Regatta. Neither crew was yet fit enough to win events and the object was to gain racing experience. The eight were defeated in the senior eights by Thames Rowing Club, who eventually won the final. The four beat Angliean Boat Club in the first heat of the junior-senior fours, then fell victims to Molesey Boat Club, who also went on to win the event.

The following week both crews competed at Marlow Regatta. The four were beaten in the first round of the Town Cup Fours by Worcester College, Oxford, who went on into the final. The eight tasted blood in the Marlow Eights with convincing victories over St. Catharine's College, Cambridge, Sandhurst and Lincoln College, Oxford; they were then beaten after a very hard race by Lady Margaret Boat Club, the eventual winners of the final. The eight attracted a good deal of attention at Marlow (one elderly gentleman was heard to remark: "The Air Force look as nice on the water as they do in the air") and won favourable comments from expert critics on the towpath.

The following week Group Captain H. R. A. Edwards, the former Oxford Blue, took over the coaching of both crews for the finishing stage of training. This period was one of mounting excitement, involving practice rows over the full course and shorter distances against pacing crews, and a great deal of "studying the form" as more and more crews arrived and began to show their paces in practice.

Henley Royal Regatta opened on Wednesday, 30th June. Both crews were watched by the Chief of the Air Staff and Lady Tedder and Air Marshal Livingston from the umpires' launch. In the morning the eight defeated Trinity Hall, Cambridge; as the conspicuous light blue blades, bearing the R.A.F. roundel, flashed victoriously past the Stewards' Enclosure the band broke into the rousing music of the Royal Air Force March —a tribute which was to become familiar to Henley spectators in the next few days. In the evening the four raced Reading Rowing Club. At the beginning of the enclosures the R.A.F. were leading by over a length with the race well in hand when stroke's stretcher-strap broke; in the resulting confusion Reading took the lead and held it to the finish.

The eight then went from strength to strength. On the Thursday they beat Bedford Rowing Club and on the Friday Weybridge Rowing Club, without being pressed. In the semi-final on the Saturday morning, they were led off the start for the first time by Reading University. However, Flight Lieutenant Whittington at stroke refused to allow himself to be hustled, and with perfectly timed spurts took his crew first level and then into the lead to win by half a length.

In the final our eight found itself representing not only the Service but Britain too, for the other finalists were Princeton University, who had sailed without difficulty through their half of the draw. The final was rowed at 5.15 in the evening and excitement and enthusiasm ran high as the crews paddled down to the start. The highly-trained and experienced American crew won by two and three-quarter lengths, but the performance of the R.A.F. crew was thus described by *The Times* Rowing Correspondent:

> "What a triumph for the Royal Air Force in this, their first Henley. To row through to the final of the Thames Cup and to lower their colours only to a premier American University crew is a feat worthy of their great fighting tradition. Let us hope that their appearance will be an annual event."

The R.A.F. Sports Board showed their recognition of this achievement by awarding R.A.F. Colours to the crew.

The crews were as follows:

Eight.—Squadron Leader N. M. Harris (H.Q. No. 90 Group), bow, Cpl. E. Kettell (Uxbridge), Wing Commander K. V. Garside (Air Ministry), Flight Lieutenant R. H. Dixon (H.Q. No. 23 Group), Flight Lieutenant G. H. Leonard (Lyneham), Wing Commander J. D. Huxley (Staff College), Pilot Officer P. T. Pulman (Honington), Flight Lieutenant L. M. Whittington (Kinless), stroke, A.C. A. Scott (Abingdon), cox.

Four.—Sergt. D. Kempson (Henlow), bow, (steers), A.C. A. J. Moyle (Yatesbury), Pilot Officer C. F. Curtis (Chivenor), Squadron Leader A. A. N. Nicholson (H.Q. Flying Training Command), stroke.

The spare man, who also rowed in the four at Reading was A.C. G. Barradell (Yatesbury).

The R.A.F. Rowing Club firmly intends that the appearance of Royal Air Force crews at Henley should be an annual event, and plans are now being made for the 1949 crews. This year's captain is Squadron Leader Nelson-Edwards, a former Oxford Trial Cap, and he already has a crew in training at Putney for the Head of the River race. Henley, of course, is the highlight of R.A.F. rowing, but the true measure of its success as a Service sport is the extent to which it is taken up on stations. Many stations have already shown what can be done—Benson, Medmenham, Henlow, Abingdon, to mention a few—and it is to be hoped that others suitably situated will follow their encouraging lead. Units in the London area can of course boat from the London Rowing Club at Putney. Interest in rowing throughout the country is increasing rapidly—this is shown by the ever-growing lists of entries for regattas. It is appropriate, then, that at this time the Service too should be taking up the sport in no uncertain manner. It seems that the enthusiasm of the original band of pioneers was not misplaced.

Concerning Personnel

AMONG new appointments made since the January, 1949, number of THE R.A.F. QUARTERLY was issued are the following:

MINISTRY OF DEFENCE

Air Marshal Sir William Elliot, K.B.E., C.B., D.F.C., to be Chief Staff Officer to the Ministry of Defence and Deputy Secretary (Military) of the Cabinet, on 19th April, 1949.

AIR FORCES, WESTERN EUROPE

Air Vice-Marshal W. A. D. Brook, C.B.E., as Chief of Staff to the Air Commander-in-Chief.

AIR MINISTRY

Air Vice-Marshal E. B. Addison, C.B., C.B.E., to be Director-General of Signals.

Air Commodore W. L. Freebody, C.B.E., A.F.C., as Director of Technical Policy.

Air Commodore D. MacFadyen, C.B.E., as Director of Plans.

Air Commodore H. D. Jackman, C.B., C.B.E., as Director of Organization (Forecasting and Planning).

Air Commodore J. G. W. Weston, C.B., O.B.E., as Director of Policy (Air Staff).

Air Commodore A. J. Rankin, O.B.E., A.F.C., as Director of Intelligence (Operations).

Air Commodore B. D. Nicholas as Director of Signals.

Group Officer M. H. Barnett as Deputy Director W.R.A.F. (2).

Group Officer Lady Seton to be Inspector of W.R.A.F.

Squadron Leader A. E. Sims, M.B.E., as Organizing Director of R.A.F. Music.

FIGHTER COMMAND

Air Marshal Sir Basil Embry, K.B.E., C.B., D.S.O., D.F.C., A.F.C., as Air Officer Commanding-in-Chief.

Wing Officer Mary Hibbert, O.B.E., as W.R.A.F. Staff Officer.

BOMBER COMMAND

Air Vice-Marshal G. H. Mills, C.B., D.F.C., to be Air Officer Commanding No. 1 Group.

Air Vice-Marshal A. Hesketh, C.B., C.B.E., D.F.C., to be Air Officer Commanding No. 3 Group.

Air Commodore J. F. Titmas, C.B.E., as Senior Personnel Staff Officer at Bomber Command Headquarters.

TECHNICAL TRAINING COMMAND

Air Commodore E. H. Richardson, C.B.E., appointed Air Officer Commanding No. 27 (Training) Group, on 17th January.

Air Vice-Marshal D. McLaren, C.B.E., K.H.S., to be Principal Medical Officer, Technical Training Command Headquarters.

Air Commodore North Carter, C.B., D.F.C., as Air Officer Commanding R.A.F. Station, Halton.

FLYING TRAINING COMMAND

Air Vice-Marshal L. Darvall, C.B., M.C., to be Air Officer in Charge of Administration.

TRANSPORT COMMAND

Air Vice-Marshal A. C. H. Sharp, D.S.O., A.F.C., as Air Officer Commanding No. 38 Group.

COASTAL COMMAND

Air Commodore J. G. Hawtrey, C.B.E., appointed Air Officer in Charge of Administration, on 19th January.

RESERVE COMMAND

Air Commodore A. D. Gillmore, C.B.E., appointed as Air Officer Commanding No. 64 (Northern Reserve) Group.

Air Commodore T. N. McEvoy, C.B.E., as Air Officer Commanding No. 61 (Eastern Reserve) Group.

MAINTENANCE COMMAND

Air Commodore A. Briscoe, as Principal Medical Officer.

K

NORTHERN IRELAND

Air Commodore B. V. Reynolds, C.B.E., as Air Officer Commanding.

No. 90 GROUP

Air Vice-Marshal R. G. Hart, C.B., C.B.E., M.C., as Air Officer Commanding.

R.A.F. STAFF COLLEGE, ANDOVER

Air Commodore L. W. Cannon, C.B.E., appointed Commandant.

R.A.F. STAFF COLLEGE, BRACKNELL

Air Vice-Marshal J. D. J. Hardman, C.B., O.B.E., D.F.C., appointed Commandant.

R.A.F. COLLEGE, CRANWELL

Air Commodore G. R. Beamish, C.B., C.B.E., as Air Officer Commanding R.A.F. Cranwell and Commandant of the R.A.F. College.

EMPIRE AIR ARMAMENT SCHOOL

Air Commodore J. G. Franks, as Commandant.

CENTRAL PHOTOGRAPHIC ESTABLISHMENT

Air Commodore S. N. Webster, C.B.E., A.F.C., to Command.

FAR EAST

Air Commodore H. J. G. E. Proud, C.B.E., as Base Commander, R.A.F. Maintenance Base, Seletar, Malaya.

Air Commodore D. A. Opie, as Senior Technical Staff Officer at Headquarters, Air Command, Far East.

BRITISH AIR FORCES OF OCCUPATION, GERMANY

Air Vice-Marshal W. J. Seward, C.B.E., as Air Officer in Charge of Administration.

ROYAL OBSERVER CORPS

Air Commodore R. B. Jordan, C.B., appointed Commandant of the Royal Observer Corps.

RETIREMENT

Air Vice-Marshal T. A. Langford-Sainsbury, C.B., O.B.E., D.F.C., A.F.C., one of the few holders of the Air Force Cross and two bars, has retired from the Royal Air Force. His last appointment was as Air Officer in Charge of Administration, B.A.F.O., Germany.

Editor's Notes

BRITAIN'S FIRST LINE OF DEFENCE

SINCE writing the Editorial, two former Air Ministers and two Marshals of the R.A.F. have again expressed their grave anxiety concerning the unpreparedness of the R.A.F. to fulfil its role as our first line of defence, should the necessity suddenly arise.

Lord Vansittart, who saw the storm cone hoisted in Russia's recent actions, said that Hitler could have been stopped, and so could Stalin now *by a really powerful air force.*

Repeated requests for the active strength and proposed programme of development to be disclosed to the public met with a firm refusal on the part of the Government on the grounds of "Security." In view of America's disclosure of her air force programme, it was suggested that the reason given was only an excuse—a smoke-screen to hide the failure of this government to provide the country with an adequate and efficient air defence.

Marshal of the R.A.F. Viscount Trenchard again demanded an adequate force of bombers. In his opinion, if we had 180 to 220 Squadrons for the whole Commonwealth we *might* prevent war.

America's success in obtaining all the volunteers she required, by paying the skilled tradesmen a wage comparable to the high wages in civilian ocupation, was pointed out, as was our failure to obtain the urgently needed skilled men because of the low rate of pay offered in comparison with that of similar trades in industry.

Marshal of the R.A.F. Viscount Portal pleaded with the Government "not to niggle" over the question of R.A.F. pay, as a generous step would solve all recruiting problems at one stroke.

For more than a year this vital problem of giving the nation an air force capable of effectively defending us, as and when we are attacked, has been inadequately dealt with. When will these grave warnings be heeded and the matter given its proper priority of *action?*

MARSHAL OF THE R.A.F. LORD DOUGLAS OF KIRTLESIDE

As we go to press we hear that Lord Douglas has been invited by Lord Pakenham, Minister of Civil Aviation, to become Chairman of British European Airways Corporation.

The Marshal of the Royal Air Force must have been considerably surprised at the "Storm in a Tea Cup" that his appointment caused in Parliament and greatly amused at the old jibe of "Jobs for the boys" from the Opposition. (He has a keen sense of humour.) Air Commodore Harvey (Cons., Macclesfield) suggested that for an officer with such an outstanding war record, who had risen to the highest rank in the R.A.F., a more suitable appointment would have been to do with our defence (presumably Minister for Defence). This also makes it clear that B.E.A.C. are fortunate in having as a Chairman so distinguished an officer. Furthermore, those of us who have had the privilege of serving on his staff and also known him for twenty-five years have no anxiety as to his administrative and organizing ability. We have every confidence that it will not be long before many beneficial changes are made in B.E.A.C. and that next year there will not be the same scope for criticism of the trading results of this Corporation as there has been in Parliament today.

As our civil airlines are a vast potential reserve for both Transport and Bomber Commands, it would appear particularly appropriate to appoint a Marshal of the R.A.F. to this post.

We notice with satisfaction that the Parliamentary Secretary, Ministry of Civil Aviation, has been instructed to enquire into and make recommendations on the outstation staffs as quickly as possible. Presumably this is the first action towards curtailing the gross duplication of staffs that now exists. Promising as this investigation may seem, it appears only to touch the fringe of urgently needed reorganization.

The amalgamation of B.O.A.C., B.E.A.C. and B.S.A.A. is long overdue and would, if effected, give a uniform administrative and operational control, remove duplication of staffs at headquarters and outstations and make such sweeping logistical economies as would enable a satisfactory balance sheet to be shown with increased efficiency in British airways.

The present attitude towards this amalgamation reminds one of the days when, despite the overwhelming advantages to be gained, vested interests delayed for a considerable time the amalgamation of the R.N.A.S. and R.F.C. and formation of the R.A.F. When the unification took place under Lord Trenchard it proved an unqualified success. With so able an administrator as Lord Douglas available, who possesses an unequalled experience of organizing flying services, it seems a great opportunity to give effect to the much needed fusion of our now unnecessarily duplicated Civil Air Lines into one British Airways Corporation.

OPERATION "PLAINFARE"

Students at the R.A.F. Staff College from Belgium, Burma, China, Denmark, France, Greece, India, Iraq and the Netherlands have visited Germany to study the British side of the Berlin air-lift. The result of this visit should do much to enhance the prestige of the R.A.F. in these countries.

ADEN'S AIR-LIFT

In a region that was once part of the kingdom of the Queen of Sheba the R.A.F. have been of the greatest assistance to some 80,000 Arabs. Facing starvation from the failure of their crops and deprived of transport from this valley over a 6,000 ft. escarpment to the Red Sea, by the consequent weakness of their camels, they were in a serious predicament. With the aid of additional transport aircraft lent by the Canal Zone of Egypt, the R.A.F. in Aden have, in the absence of any roads or landing grounds, dropped grain, like manna from the skies, thereby saving these Arabs from starvation. It must have been an interesting operation for the aircrews, as they flew over some of the most romantic towns in the world, such as Shibwan with its eleven-storied skyscrapers raising their alabaster and mud-brick walls sheer from the sands of the Wadi Hadhramaut, giving the impression to the traveller of a miniature but just as spectacular Manhattan. (The details of this operation would make interesting reading supported by suitable illustrations, and the Editor would be grateful if the A.O.C., Aden, would consider undertaking this or deputing someone with a flair for writing to forward the story with a selection of photographs.)

No. 2 GROUP RE-FORMED in B.A.F.O.

To strengthen the position of the R.A.F. in Germany No. 2 Light Bomber Group has been re-formed in the British Zone under the command of Air Commodore L. F. Sinclair, G.C., C.B., C.B.E., D.S.O., A.D.C., and from its headquarters at Sundern, near Guterslok, has taken over control of all operational squadrons in Germany.

This Group played an outstanding role during the war and was at one time commanded by the present A.O.C.-in-C., Fighter Command, Air Marshal Sir Basil Embry, K.B.E., C.B., D.S.O., D.F.C., A.F.C.

On 3rd September, 1939, a pilot of a Blenheim from No. 2 Group took off on the first operational sortie of the war and earned the first Distinguished Flying Cross to be awarded in the Second World War.

The Group sent the first bomber over Berlin in June, 1940; bombed the German invasion barges lying in the Channel ports; attacked *Scharnhorst*, *Gneisenau* and *Prinz Eugen* in their dash through the English Channel; supported the Commandos at the Dieppe landings; and carried out the bombing of the Gestapo Headquarters and Saboteur Schools.

Other highlights of No. 2 Group's war history were the breaching of the Amiens' prison to release hundreds of political prisoners and hostages (an operation from which the heroic Group Captain Percy Pickard, D.S.O., D.F.C., never returned) and the attack on Bremen, for which Wing Commander H. I. Edwards was awarded the Victoria Cross.

"PUSH-BUTTON" WAR

Sir Robert Watson-Watt, speaking recently at a reunion dinner of the Radar Association, said he did not believe in the imminence of what the newspapers called a "push-button" war. But the price of averting a highly technical war of unprecedented destruction included a realistic acceptance of the need for wise precautions. With piloted and pilotless aircraft pushing holes through the sonic barrier, with guided missiles hurtling through the upper atmosphere, with earth sattelite vehicles adding to the newer lunacy with atomic bombs and radio-active clouds, with bacteriological and biochemical warfare under serious discussion throughout the world, we must recognize that an efficient early warning system, an effective interception system, and an elastic counter measure system depended not on the buttons to be pushed but on the expert knowledge and training of the button-pushers.

"This group of foundation members of the now ancient order of radar button pushers," he said, "has a great moral responsibility for the continuing and developing efficiency of the radio and radar elements that are vital to our defences."

He concluded by saying that those present were the natural core of the fighter control units, of the radar trades in the R.A.F.V.R., and the nation's need for them to rejoin, to maintain their old skill, develop new skill themselves, and hand on their knowledge to the newcomers who may have to repeat the triumphs of the radar teams who were so recently among the indispensable contributors to the saving of civilization.

"ATLANTIS AND BOGOTA"

In this number appears the above article, by an author now well known to our readers (J. M. Spaight, C.B., C.B.E.). He draws attention to the incompleteness of the Atlantic Pact if it fails to include the necessary action to be taken to supress "the cold war" or fifth column activities by a foreign power.

Clearly, it is insufficient to safeguard a country against armed aggression only in these days, when the new war strategy employs propaganda and fifth column methods first and not infrequently accomplishes the complete subjection required without using her military forces.

The most elaborate organization of military defence is of little worth if it is liable to be broken not only by direct assault in front but by sabotage in the rear. As the author so aptly puts it: "There can be no Plevna to hold the Russians on the Rhine if the men behind refuse to pass the ammunition."

PAKISTAN

Air Vice-Marshal R. L. R. Atcherley, C.B.E., A.F.C., took over the command of the Royal Pakistan Air Force on 1st February. A flying enthusiast and sound administrator will therefore have the task of modelling this air force on the lines of the R.A.F. As his deputy he has Air Commodore Janjua, who was commissioned with the Indian Army in 1934 and seconded to the R.A.F. in 1938, and in the near future the furtherance of the training of Pakistan officers will be accomplished by attaching them to R.A.F. stations in England, such as Cranwell.

We shall take a great interest in the building up of this new air force and invite the new Air Officer Commanding to contribute an article for this Journal for the information of the R.A.F. and other Dominion air forces as to their problems and life in general in Pakistan.

RETIRED OFFICERS

There seems to be a real need for some means of keeping contact with officers who have retired from the Royal Air Force.

Spasmodic reunions, such as that held for ex-officers of the R.N.A.S. and R.F.C. at Londderry House on 31st March, are of too transitory a nature to meet this need.

There must be hundreds of officers who retire and despite an ardent desire to keep in touch with old friends, drift into the oblivion of retirement, growing old in their obscurity and all the time wondering where "old so-and-so" is and what he is doing.

The joy of chance meetings, followed by excited questionings, reminiscences of the old days, only leaves us eventually to return to our farm, office, caravan or circus tent with a strong desire that we should like to do this more often.

If any retired officers have any suggestions to make, we should welcome them. It seems that THE R.A.F. QUARTERLY might help in this matter, either through the "Correspondence Column" or by publishing a list of retired officers, with a short résumé of how they are spending "the evening of their lives," giving their address, so that long-forgotten friends, who may only be living a few miles away could exchange news of yesterday, today and tomorrow with them.

The introduction into this Journal of "Editor's Notes," "Personal Matters," the "Correspondence Column" and "Sports Page," was influenced considerably by some such aim as this.

It has great possibilities, and if only retired officers would initiate action by writing to the Editor, The Old Cottage, Maplehurst, near Horsham, Sussex, he would place these columns at their disposal. Do not leave this until tomorrow; remember the brief note used so frequently by that great war leader, Winston Churchill, "Action this day"!

NEW UNIFORM FOR AMERICAN AIR FORCE

The American Air Force has adopted a distinctive new uniform of its own—slate blue in colour and with entirely different insignia. Generally similar in style to the present khaki, it will go into use gradually, with complete replacement expected by 1st September, 1950.

Major change besides the colours—which is called Uxbridge blue, and is slightly darker than R.A.F. uniforms—lies in the accoutrements. All leather will be black, and gold buttons and insignia will be replaced by oxidized silver. Traditional wing and prop lapel and collar insignia are out; also shoulder patches. Uniform is identical for officers and enlisted men, except for rank insignia.

Officers will wear a metal "U.S." on lapels, their rank on the shoulder as now, and present cap device in new colour. Enlisted men will wear a metal "U.S." with a circle around it on each lapel and a new style cap device. It is identical with the officers' except smaller, and has a circle about it.

For the present, the new slate blue shade will apply only to the overcoat. A light blue shirt and midnight blue tie will be worn. The khaki summer uniform will be regulation for the present, but the Air Force is working on a new garb. Aviation cadets will shift into blue, similar to pre-war, in April. Dark blue and silver grey shoulder boards will designate cadet rank.

Correspondence

(A FORUM OF DISCUSSION WHEREIN READERS MAY EXPRESS THEIR OWN OPINIONS)

The Editor, "The Royal Air Force Quarterly"

SIR.

Having been at an inter-Service institution for the past eighteen months, I have noticed with astonishment the vast allocations of paper which have been made to Army and Navy journals, magazines and "dreadfuls." My astonishment is only increased when I survey the material which is subsequently printed upon these rolls of paper!

But seriously! There is no doubt that officers who take their profession seriously must read widely and give a great deal of thought to war. Most thinking men find that they can focus their thoughts most logically by assembling them in written form. Having gone so far, it is a healthy and proper inducement to provide them with a forum in which they can test their views in the glare of informed opinion!

Where are our thinkers in the Royal Air Force? Too busy?. . . nonsense! Let them contribute to the mass of informed ideas which should be flowing through the minds of every R.A.F. officer. A healthy flow of red corpuscles through the brain might be too drastic a transfusion for some, but the majority would thrive!

Where is our forum? At present we have THE ROYAL AIR FORCE QUARTERLY as the main journal of general interest to all R.A.F. officers. However, the paucity of supporting R.A.F. journals forces the QUARTERLY to cast an editorial policy of very wide mesh. It seeks to include in its net original articles of a serious strain, sporting anecdotes, amusing articles, Service notes, and now a correspondence column. The amusing articles are presumably designed to tempt the dolt of a fellow whose life is one endless search for amusement, into perusing the QUARTERLY in the off-chance that his eye may stray to the solid stuff of which our Service thinking should be made.

Potted courses and technical excellence are no substitute for education. Go to the ends of the earth, visit an R.A.F. Mess, inspect its library and the magazines to be found littered about the ante-room (or are there such things as reading rooms?) and guestimate what volume of new and productive thought is passing through the minds of the "young idea."

Well, it is probably not a much worse state of affairs than existed in other Services in the past. But now they have at least a reasonably wide circulation of thoughtful journals and a good outlet for the thinker. Let us not be far behind! Let us ensure at least that there is no R.A.F. Mess without THE ROYAL AIR FORCE QUARTERLY. Let us encourage officers to present their views. . . Damn it, an officer should get used to being wrong, and being told so: he might as well enjoy the dialectics! How else can we prove our ideas?

I call for a more courageous circulation of ideas through all possible mediums. THE ROYAL AIR FORCE QUARTERLY stands out in the lead just now. Let it increase in stature; let it find its way to every Service Mess; let controversy burn the pride and sloth from you lazy louts sprawling around the Mess, spurring you to put pen to paper!

A healthy, lively and ceaseless flow of ideas through the minds of officers of a Service upon which is being thrust an ever-increasing responsibility for the national war effort, can be a major contribution to the preservation of Service knowledge against the corroding influences of these inert days of financial stringency and nebulous diplomatic fencing.

Well, Mr. Editor, that is what I think! You will understand my reluctance to sign my name, and so I must remain

Yours faithfully,

VULCAN.

[*Note.*—Whilst strongly opposed, in principle, to publishing anonymous letters, the soundness of the reasons given in this particular case were such as to persuade me that it was desirable.—EDITOR.]

The Editor, "The Royal Air Force Quarterly"

DEAR SIR,

I should like to congratulate you on the continued high standard of THE ROYAL AIR FORCE QUARTERLY. It would be so easy to let it degenerate into just another aviation newspaper, and yet you always manage to include authoritative articles that give a completely new angle on subjects of sufficient importance to stimulate discussion and a deeper interest.

In this respect I was particularly impressed by Squadron Leader Kenyon's article "Libertie and the Highest Sky" in the January, 1949, issue of the QUARTERLY. One gets so tired of reading about what the next war will be like, before one has had time to get over the last two, especially when the same old indiscriminate atom bombings are flung in after every few sentences as the "be all and end all" of modern warfare. In contrast, Squadron Leader Kenyon's arguments are well thought out, sound and, whether or not one agrees with the policy he proposes, there is little doubt that he has put forward a practical policy, which is quite a rare thing these days.

Normally I should have criticized the inclusion of an article on the R.A.F. Provost Corps on principle! But you have shown so well that they are not only essential and efficient but also human that I have not the heart to do so now.

Two features which I always look for eagerly are your Quarterly Notes on the R.A.F. and Empire Air Forces and your Book Reviews. The former give many interesting little news items that might otherwise be missed in these days of small newspapers, while the reviews are an intelligent guide for those who, like myself, try to maintain a reference library of all worth-while books on aviation.

JOHN W. R. TAYLOR.

1st March, 1949.

Book Reviews

CRUSADE IN EUROPE, by Dwight D. Eisenhower (Heinemann; 25s.).

In the space of just over five hundred pages General Eisenhower tells his story of the Second World War. His book has made a profound and unique contribution to history. His position from late 1942 was Commander-in-Chief, under various titles, of most of the Allied expeditions in the Mediterranean and of the final campaign in Europe. His record of events and the men who made them, as well as his views on the conduct of the war, are as interesting as they are invaluable. Yet in another respect the book will prove of immense use to the historian of future generations, for his personality is stamped across every page.

The early chapters are devoted, naturally enough, to his own appointments during that phase of the war when America was, in general, refusing to recognize the threat the Axis offered to the New as well as the Old World. He adds a solemn note of warning about future unpreparedness.

As soon as he is appointed Commander-in-Chief of the North African expedition his book becomes more interesting to British readers. We follow him through the discussions which led to the decision to send such an expedition in the winter of 1942. The landings and subsequent race for Tunis and Bizerta which failed to forestall by such a short margin the German occupation, the mud and supply difficulties, and the final victory in Tunisia, are seen through the eyes of the Commander-in-Chief. The curious semi-political background in North Africa is fully explained, and the reasons General Eisenhower gives would seem to justify the Clark-Darlan agreement which aroused so much hostility in the U.S.A. and in Great Britain. He takes us along with him in the invasion of Sicily and through the Italian campaign till he leaves to take up his appointment as Supreme Commander of the Allied Expeditionary Force.

Over half the book is devoted to the liberation of North-West Europe. This carries the reader through the mazes of intricate planning necessary for the assault on Hitler's Europe, through his tense hours on D Day, through the pursuit of the German armies, through the crossing of the Rhine to the eventual capitulation of Germany on 8th May, 1945.

It must be remembered, however, that CRUSADE IN EUROPE represents only General Eisenhower's point of view and that the book was designed primarily for the American public. Others have found offence in what he has written, or failed to write, and claim that on occasions he has been less than fair to British participation. From the strictly air point of view, he pays many tributes to the work of the air forces and is one of the few high-ranking Army officers to write of the importance of this factor in modern warfare; but a few amplifications might not come amiss.

Throughout the book he is at pains to emphasize the doctrine of unity of command. The need for such unity was exemplified in the control of air forces during the early days of his first campaign. Originally in North Africa there were two separate air forces, both independent of each other, but co-operating under the Allied Commander-in-Chief. This arrangement broke down within six weeks of the landings and, for two months, stop-gap methods were adopted to make effective use of the air forces.

At the Casablanca Conference in January, 1943, the Combined British and American Chiefs of Staff decided that the most efficient and effective use of air power in the Mediterranean could only be achieved by amalagamating all the air forces in that area under a single air commander. At the same time the naval and military commands were reorganized on similar lines. General

Eisenhower was appointed Allied Commander-in-Chief of the Allied Forces in the Mediterranean. Under him were three commanders-in-chief of the land, sea and air forces.

General Eisenhower, unconsciously perhaps, is writing from the standpoint of the soldier, and thus appears to miss one of the most vital reasons for the final Allied victory in the Mediterranean, viz, the indisputable air superiority of the Allies.

Turning to the European theatre, his modest and factual account cannot hide the essential greatness of the man. He was called upon to take personal decisions which would have historic results. Although historians will be in general agreement with nearly everything the Supreme Commander has written, there are occasions when he expresses his own opinion without presenting an opposite view quite as fully as some of the controversial subjects warrant. On page 270, for example, he tells how his Air Commander-in-Chief, Air Chief-Marshal Leigh-Mallory, warned him in most emphatic terms that no reliance could be placed upon the successful outcome of the American airborne operations on the night before D Day. To Leigh-Mallory, who had long been struggling to get the Army to recognize that the planning of airborne operations was primarily a matter for the Air Forces, this plan seemed likely to lead to disaster. General Eisenhower's book does not make this point, nor does it add that the plan finally adopted was completed before the Air Commander-in-Chief was even consulted. The operation was thought to be essential to the plan to secure a beachhead on the Cotentin Peninsula, and the Supreme Commander decided that, whatever the risk, it had to be executed.

The Air Commander-in-Chief, knowing from experience the effectiveness of German light flak, wrote to the Supreme Commander, pointing out the risks involved in 1,000 fully-laden, slow aircraft flying at less than 1,000 ft. in full moonlight over country occupied by concentrations of German troops. These vulnerable aircraft had no armour or self-sealing tanks nor had they defensive armament. They could not easily break formation and would be forced to fly in a stream for three hours over fully alerted defences. The arrival of about fifty per cent. of the total force was stated to be absolutely vital to the beach assault but there seemed no certainty that even fifty per cent. of the force would be effective.

General Eisenhower says that on receiving the letter "I went to my tent alone and sat down to think. . . I realized . . . that if I deliberately disregarded the advice of my technical expert . . . and his predictions should prove accurate, then I would carry to the grave the unbearable burden of a conscience justly accusing me of the stupid, blind sacrifice of thousands. . . Finally, Leigh-Mallory's estimate was just an estimate, nothing more, and our experience in Sicily and Italy did not by any means support his degree of pessimism. . . I was encouraged in the belief that Leigh-Mallory was wrong."

All through D Day, glowing accounts came in about the amazing success of the operations. Less than three per cent. of the troop-carrying aircraft had been lost and on the strength of progress made and reports from aircrews it was universally assumed that the American airborne divisions had been correctly put down on their dropping and landing zones. With characteristic generosity, Leigh-Mallory immediately wrote to his Chief expressing his great pleasure that events had proved him wrong and, so far as those great commanders were concerned, the matter was closed.

But a further examination of facts which only came to light gradually, and which have received less attention than they deserve, has revealed several points of some interest to the serious student of air aspects of these operations.

It is now known that the drop was very badly scattered, though opposition was much less than was feared. Instead of being put down on six small zones, it was, disregarding strays, dropped in a rectangle twenty-five miles by fifteen miles. It seems clear that considerably less than fifty per cent. of the total force was effective, though it is also clear that the losses due to a scattered drop were very much greater than those due to aircraft destroyed. In the result, thanks to the confusion largely resulting from this scattered drop, which prevented the enemy from making an early appreciation of the situation, and thanks also to the truly memorable work of the airborne troops, considerably less than the fifty per cent. of the total force believed necessary was able to accomplish most of the required tasks.

Students of history will be interested in General Eisenhower's version of a difference of opinion he had at the end of March, 1945, with Mr. Churchill and the British military chiefs over the direction in which he should order his final advance into Germany. The British view had always been that the main Allied effort should be made in the north to seize the Ruhr and advance along the great trunk routes to Berlin. This strategy had been accepted at the Malta Conference earlier in the year.

General Eisenhower decided that the northern group of armies should play a secondary role while the central group of armies undertook the final advance into Germany upon a southern axis. The grounds on which his decision was based are well presented in the book, but the other side of the question is inadequately expressed. The Supreme Commander does not agree that in changing the plan and in communicating this change of plan to the Russians without giving his own chiefs an opportunity of commenting on the larger strategical and international issues he was in any way at fault.

His explanation leaves one unconvinced that he was right and Mr. Churchill wrong. For us today it is a sufficiently eloquent comment that Marshal Stalin cordially agreed with General Eisenhower's statement at the time that Berlin no longer had any strategic or political importance. As a final comment, one might quote the opinion of one of the shrewdest German strategists, General Blumentritt, formerly Chief of Staff, Commander-in-Chief West, who in discussing the final Allied advance into Germany, wrote that operationally and politically Berlin was the target. Germany's strength was in the north and he who held Northern Germany, held Germany.

For the rest, the book is well referenced and the author cites chapter and verse for his statements. It is well illustrated with over forty maps and contains an exhaustive index and that most important adjunct of modern military writing, a copious glossary.

If style is the man, then the writing amply displays those qualities for which General Eisenhower is renowned; his ability to see the main issue clearly and never to be shaken by temporary setbacks, nor to be side-tracked by minor but seemingly important issues. That very imperturbability which is General Eisenhower's, dominates his prose. This book is one not meant to be read at a single sitting, but the general reader as well as the specialist will find in it much food for thought.

J. C. R. D. & T. M.

THE WOODEN HORSE, by Eric Williams (published by Collins), 10s. 6d.

In contrast to the classic story of the Trojan Horse with its aura of heroism marred by treachery, Eric Williams' book, The Wooden Horse, is a story of courage, ingenuity and determination in the face of adversity of a very different kind. Such stories are not uncommon in times of war but this is exceptional in that it has the sombre background of a prisoner of war camp in Germany and relates in an accomplished manner one of the most ingenious escapes from a place of confinement ever to be attempted. It tells how three officers tunnelled their way out of the east compound of Stalag Luft III and how, after many adventures, they reached Sweden and became the only people to escape successfully from that camp. The author was one of these men.

The book gives, without licence or exaggeration, an accurate picture of existence in a prison camp where thousands of men lived in a strange half-life poised between two worlds. A life composed of noise, dirt, extremes of heat and cold, insufficient food and accommodation so grossly overcrowded that in all the hundreds of days that dragged past the only privacy was in sleep; a life full of nostalgia and dreams, and a life that called for all the reserves of tolerance and patience that a man could muster. Nowhere was there so much evidence of the balance and extraordinary resilience of temperament which enabled men to endure privations and discomfort far beyond the experience of ordinary mortals. Perhaps their greatest defence against the incursions of insanity and despair was the sardonic humour indigenous to the British of all classes and so lacking in the Teutonic mind. That strange humour, so incomprehensible to the Germans, that laughed at disaster without disregarding it and derided the faintest possibility of ultimate defeat.

Stalag Luft III was, by comparison with the other prison camps in Germany, undoubtedly one of the best from the prisoner's viewpoint as regards living accommodation and the attitude of the Germans. The Luftwaffe, it appeared, believed in the velvet glove policy in their treatment of British and American prisoners. Their intensity of purpose—to prevent escape—was no less evident but there were fewer instances of the bullying, arrogant stupidity, petty nastiness and pointless discomfort than at camps controlled by the Army. There was less interference with prisoners' activities—the principal one being the effort to keep fit by playing games of every known kind. Football, Rugby, baseball, skating, etc., went on, in their season (despite severe space limitations) from early morning until the huts were locked at night. The Germans even laid a concrete cricket pitch. A golf course was built and used incessantly—one of the "browns" was immediately adjacent to the wooden horse. The Germans viewed all this activity with amused contempt but they tolerated it and thus, in the summer of 1943, when the vaulting horse made its daily appearance within a few yards of the German sentry box, it was small wonder that it was regarded by them as merely further evidence of English madness .

By this time the effect of what was, by German standards, reasonable treatment, and the fact that the war was four years old, could be dangerous to the mental outlook of the prisoner of war. It was all too easy to become relaxed and resigned to waiting for the war to end; to live for the day and adopt the "ca ne fait rien" philosophy. Men could scarcely be blamed for this attitude of mind; most of them had attempted to escape once, if not many times, and failed—it now seemed impossible—the odds were too great. This insidious apathy had to be constantly guarded against by intending escapers, especially in this instance where the scheme involved months of monotonous and arduous work. There must have been many occasions when their patience and determination were almost exhausted, but they never gave up.

The success of the "Wooden Horse" scheme lay in its simplicity—there it stood for all the world to see—while inside and beneath it a man was working on the first stage to freedom. The best hiding place is often the most obvious. Not even did the Germans never suspect its purpose but for a considerable time the majority of the prisoners were in ignorance, so good was the security.

The author describes in interesting detail the difficulties which had to be overcome—difficulties which might appear insuperable to the lay mind. Any one of numerous details might, if overlooked, prove fatal and negative in a moment months of unremitting toil. He conveys, with an expert pen, the horror of lying naked for hours in a terribly confined space with the dreadful possibility of being buried alive, the suspense of the searches, the staging of diversions and the ultimate climax of the actual "break."

Escaping from a prison camp was less than half the battle of getting home; the dangers and difficulties were intensified outside and the need for good fortune and quick-wittedness ever greater. Inside the camp the problems of escaping could be assessed and tackled almost at leisure; but once outside unforeseen emergencies might arise and have to be overcome at a second's notice. The description of the tension and anxiety of the days following the "break" is told so well as to make it difficult to put the book down.

The aftermath of the escape was not without incident for those in the camp. The tunnel was discovered later the same night. The Germans immediately attempted an identity check but were frustrated by some heat fusing of the lights in one hut, and few, if any, of those present during the next day, known afterwards as Black Saturday, will forget the drama of 200 Germans in a dangerous frame of mind, with tommy guns at the ready. Guns they would have used at the slightest sign of insurrection. The golf course was torn up; the Germans thought it had been used as a means of dispersing the sand from the tunnel and various restrictions were imposed, but it was more than worth it. As the weeks went by and there was no sign of the three men it seemed that success had been achieved.

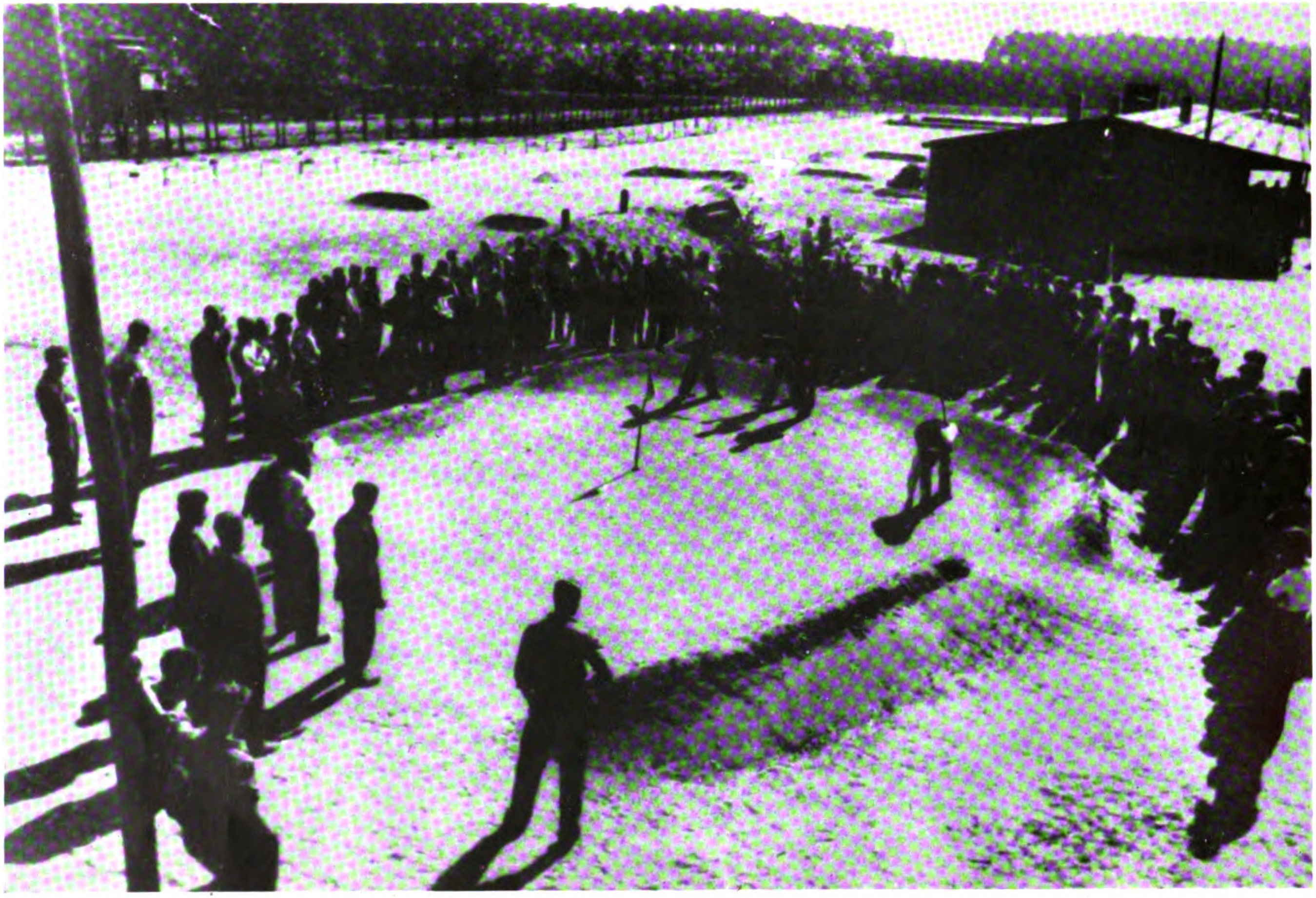
The Wooden Horse is an excellent book—the writer has a fine sense of narrative and description—ex-prisoners of war will find themselves living again those strange months and will derive amusement in identifying the characters in the book, who are described with humour and sympathy. It is no exaggeration to say that the qualities shown by those partaking in this adventure were a projection of that spirit so typical of British airmen. The element of luck, as always in these matters, had to play its part, but it is possible that the ultimate success of the escape was due to that indefinable quality of character and mind of which there is evidence in the writing of this book.

P. A. W. T.

Air Victory—The Men and the Machines, by Harold B. Hinton. Harper & Brothers (New York); $5.00 (428 pp.).

This book does not make light reading; nor is it meant to do so. It traces the growth of the United States Air Force from 2nd August, 1909, when it bought its first aeroplane for $30,000, to when it had become the world's most powerful military machine; and it tells how that machine was then allowed to fall to pieces because men again believed that they had won the war to end wars.

Air Victory describes the administration and strategy of the U.S.A.F. rather than its achievements in war and Mr. Hinton certainly pulls no punches. As he points out: "The picture is not an altogether glorious



VIEW OF EAST COMPOUND, STALAG LUFT III
The white cross indicates point where Wooden Horse was placed when tunnelling was in progress. At the top left can be seen the sentry box. On the right is the kitchen building where the "Horse" was kept when not in use

one, and some of the errors have a repetitive character which bodes ill for the future." But the reader is left in no doubt that he considers American aircraft and airmen the best in the world when under capable command. The thirty-two pages of illustrations have been well chosen and most of them are new and very interesting photographs from U.S.A.F. archives.

The story of the Air Service's part in World War I is dismissed in a few pages. In spite of early plans to build 3,500 aircraft a year in the United States, "the Service stood, in May, 1918, practically a complete failure" through lack of organization. There was some improvement in the closing months of that war and, by Armistice Day, American pilots had destroyed 781 enemy aircraft for a loss of 289 of their own. But few victories were scored on aircraft built in America. Brigadier-General Halsey Dunwoody explained: "I spent $65,000,000 (abroad), obtained 7,000 aeroplanes and thoroughly equipped American aviation. The rest of the $1,000,000,000 appropriated by Congress was spent in the United States and from this expenditure we never had a single plane fit to use."

Unfortunately, says Hinton, America did not learn the lesson that air power cannot be obtained simply by turning a tap. The chapters describing the next ten years recall achievements such as world speed and altitude records and, more seriously, practical proof that air bombing could sink a battleship. This served only to make worse the already bitter feelings between the Air Service and the Navy, until finally Brigadier "Billy" Mitchell's outspoken criticism of Government policy led to a court-martial, suspension from duty and in 1946, ten years after his death, a special medal "in recognition of his outstanding pioneer service and foresight in the field of American military aviation"!

In 1926, the newly-designated Air Corps was authorized to buy 1,500 aircraft; by 1931 it had received thirty-nine. But there were signs of growing official interest. For instance, Chief of Staff General Douglas MacArthur reported in 1933 that "efficacy of air support for our land and sea forces in battle might well be the determining factor in victory or defeat."

Gradually, as men like Carl Spaatz and George Kenney began to assume positions of command, training was improved and prototypes of such aircraft as the Flying Fortress were ordered. But the War Department saw no use for large bombers and, at first, purchased only a test batch of thirteen aircraft.

When war broke out in Europe, the U.S. Army Air Force was undermanned and ill-armed with aircraft that would not have lasted ten minutes against the Luftwaffe. But—and Mr. Hinton makes no attempt to disguise the fact—the R.A.F. came to the rescue. By ordering 8,000 warplanes from America, and spending $322,000,000 on extending American aircraft factories and buying machine tools for their own, the British and French Governments set in motion the productive effort that later made the U.S. aircraft industry the greatest single industry in the world.

Later, when America entered the war, the Air Staff was quick to take advantage of R.A.F. experience. R.A.F. training methods were copied, officers sent to Britain to study intelligence methods and British equipment such as gun-sights, radar and gun-turrets adopted. By May, 1943, U.S. output of aircraft exceeded that of the rest of the world and, behind the scenes, giant Superfortress bombers were beginning to take shape in American factories.

The achievements of the U.S.A.A.F. in World War II are too recent to need recalling here. Mr. Hinton's story of triumphs of organization behind the scenes are lively and interesting; his comments on the overwhelming might of modern air power are convincing. He sums up the war's end thus: "The Navy had the transport to make invasion of Japan possible; the ground forces had the power to make it possible; and the B-29 (Superfortress) made it unnecessary." But the war was no sooner won than aircraft production was brought to an abrupt halt and demobilization became such a rout that at one time the U.S.A.A.F. could not have put a single operational group into the air.

Three years ago experts set the minimum size of Air Force needed to safeguard the United States from future attack as seventy groups; the U.S. Government recently reduced the size of the U.S.A.A.F. to forty-eight groups. A copy of Mr. Hinton's book should be sent to every member of Congress—they would probably change their minds very quickly!

ARTICLES OF AIR INTEREST IN CURRENT PERIODICALS

Aero Digest (American periodical). The December, number was a special Air Navy (U.S.) issue and is devoted to articles on that subject from various standpoints. (*Aero Digest*, December, 1948.)

"Air Power in Commonwealth Defence," by Air Chief Marshal Sir Guy Garrod. (*National Review*, December, 1948.)

Do. (short letter), by Admiral Louis Hamilton (*National Review*, January, 1949.)

"Milestones of Military Aviation." (A summary review of the military aviation position as revealed in the new edition of Jane's *All the World's Aircraft*), by G./Capt. G. W. Williamson. (*R.U.S.I. Journal*, November, 1948.)

"Sea and Air Power," by J. M. Spaight. (*R.U.S.I. Journal*, November, 1948.)

"The American Attitude towards War," by Dexter Perkins. (*Yale Review* (U.S.A.), Winter, 1949, December, 1948.)

"France and the Future German State," by Robert Strausz-Hupé. (*Yale Review* (U.S.A.), Winter, 1949, December, 1948.)

"Stalin on Revolution," by "Historicus." (*Foreign Affairs* (U.S.A.), January, 1949.)

"No Peace, No War," by Max Beloff. (*Foreign Affairs* (U.S.A.), January, 1949.)

"The British Navy and the Russian," by Rear-Admiral H. G. Thursfield. (*National Review*, January, 1949.)

"The Army we Require," by Major-General L. O. Lyne. (*National Review*, January, 1949.)

"France on the Atomic Trail." (*Economist*, 15th January, 1949.)

"Some Aspects of Soviet Constitutional Theory," by A. Nove. (*Modern Law Review*, January, 1949.)

"Naval Aviation and the Influence of its Mission on Carrier-Based Aircraft (illustrated)," by Rear-Admiral T. C. Lonnquest, U.S.N. (*Aeronautical Engineering Review* (U.S.A.), November, 1948.)

SELECTED LIST OF NEW BOOKS

AIR AFFAIRS

The History of the United States Air Forces in World War II. Vol. I. Plans and Early Operations (January, 1939—August, 1942). By W. F. Craven and J. L. Cate (Editors). (Vol. I of the U.S.A.F. Official History.) 788 pp. (University of Chicago Press, 1948.)

The Desert Air Force. By Roderic Owen (F./Officer R. F. R. Fenwick-Owen). (With a Foreword by Marshal of the R.A.F. The Lord Tedder, G.C.B.) (Hutchinson, London, 1948.)

Devilbirds. The Story of U.S. Marine Corps Aviation in World War II. By John A. De Chant. (Foreword by General A. A. Vandegrift, Commandant, U.S. Marine Corps.) 265 pp. (Harper, N.Y., 1947.)

MILITARY

Crusade in Europe. With three Appendices—(*a*) Allied Order of Battle for Final Offensive; (*b*) The Allied Air-Ground Team for the Final Offensive; (*c*) The German Ground Forces; and a Glossary of Military Code Names (of Operations). By Dwight D. Eisenhower. 582 pp. (*Note*.—The American Edition of this work was published in November, 1948.) (Heinemann, 1948.)

The Role of General Weygand—Conversations with his Son. By J. Weygand (Commandant). (Translated by J. H. F. McEwen.) (With a number of Appendices.) 191 pp. (Eyre & Spottiswoode, 1948.)

BIOGRAPHY

I Remember (Autobiography). By Viscount Swinton. (Lord Swinton was Secretary of State for Air, 1935-38.) 272 pp. (Hutchinson, 1948.)

Ciano's Diplomatic Papers (1936-42). By Malcolm Muggeridge (Editor). (Translated by Stuart Hood.) (With an index to personalities.) 490 pp. *Note*.—The original Italian Edition of this book was entitled L'Europa verso la Catastrofe. (Odhams Press Ltd., 1948.)

POLITICAL

This is Pearl! (The U.S. and Japan, 1941.) By Walter Millis. 384 pp. (William Morrow & Co., N.Y., 1947.)

The Mediterranean: Its Role in American Foreign Policy. By William Reitzel. (Published for the Yale Institute of International Studies.) 195 pp. (Harcourt Brace, N.Y., 1948.)

NAVAL

"The Med." The Royal Navy in the Mediterranean (1939-45). By Rowland Langmaid. (Author was official Admiralty artist, Mediterranean Fleet.) 130 pp. (Batchworth Press, London, 1948.)

ATOMIC ENERGY

The Control of Atomic Energy: A Study of its Social, Economic and Political Implications. By J. R. Newman and B. S. Miller. 434 pp. (McGraw Hill, New York, 1948.)

BRITISH COMMONWEALTH

The Commonwealth and the Nations: Studies in British Commonwealth Relations. By N. Mansergh. 229 pp. (Royal Institute of International Affairs, 1948.)

U.S.A.

The U.S. and South America (The Northern Republics). By A. P. Whitaker. 280 pp. (Harvard Univesity Press, 1948.)

The U.S. and the Caribbean. By Dexter Perkins. 253 pp. (Harvard University Press, 1947.)

(Two volumes in the American Foreign Policy series.)

U.S.S.R.

Soviet Politics at Home and Abroad. By F. L. Schuman. 633 pp. and Index xxv pp. (London: Robert Hale, 1948.)

FRANCE

Parliament and Foreign Policy in France: A Study of the Origins, Nature and Methods of the Parliamentary Control of Foreign Policy in France, with Special Reference to the Period from 1919 to 1939. By J. E. Howard. 172 pp. (London: Cresset Press, 1948.)

POLAND

The Pattern of Soviet Domination (In Poland, 1939-48). By Stanislaw Mikolajczyk. 353 pp. (London: Sampson Low, 1948.)

GEOGRAPHY

Our Air-Age World: A Textbook in Global Geography. By L. O. Packard, B. Overton and B. D. Wood. (A World Geography written from an Air Standpoint.) 838 pp. With a short bibliography of reference books and supplementary reading and an Index. 37 pp. (New York: Macmillan, 1945.)

A COMPREHENSIVE BANKING SERVICE

For nearly 150 years Holt's have been intimately associated with both the issue of Service Pay and with meeting the banking requirements of Officers of the Services.

Officers entrusting us with their financial affairs enjoy substantial advantages; their Banking Accounts and the administration of their Service Pay are together handled by one organization—a Private Bank giving the benefits of a world-wide Banking Service that is adaptable, individual and complete in every detail.

GLYN, MILLS & CO., HOLT'S BRANCH
KIRKLAND HOUSE, WHITEHALL, S.W.1.
Bankers and Official Royal Air Force Agents
HEAD OFFICE: 67 LOMBARD STREET, E.C.3

Associated Banks: Royal Bank of Scotland Williams Deacon's Bank, Limited

PITMAN'S AERONAUTICAL BOOKS

A Selection

Aircraft Radio and Electrical Equipment

By Howard K. Morgan, Superintendent of Communications, Transcontinental and Western Air, Inc. A book by a leading American expert, giving detailed information on up-to-date equipment. With over 200 illustrations. 22/6 net.

Aircraft Engines of the World, 1948

By Paul H. Wilkinson. An essential reference work on engines, fuels and lubricants, covering 12 countries, and including many jet and turbine engines. With 142 full-page illustrations. 50/- net.

Aircraft Materials and Processes

By George F. Titterton. The information in this book is based on American experience in the use of metal alloys and other materials, and is important to everyone concerned with aircraft design and manufacture. Second Edition. Illustrated. 25/- net.

Air Transport Navigation

By Peter H. Redpath and James Coburn. A first-class guide for all transport pilots and navigators. Illustrated. 612 pages. 25/- net.

Photographic Surveying

By B. B. Talley and Paul H. Robins. This is a sound guide to the use of the camera and to the principles of map development and photographic interpretation. Illustrated. 24/- net.

Sir Isaac Pitman & Sons, Ltd., Parker St., Kingsway, London, W.C.2

Out of the
top
drawer

VAN HEUSEN

THE WORLD'S BEST SEMI-STIFF COLLAR

Made by: HARDING, TILTON & HARTLEY LTD. LONDON & TAUNTON

The name of

T. M. LEWIN

is known the world over as designers and makers of "Colours" by appointment to the R.A.F. Squadrons and Units, in addition to Regiments of British and Indian Armies, Auxiliary, Military and Police Forces in all parts of the British Empire.

DESIGNS SUBMITTED FOR NEW COLOURS

Quotations given on receipt of particulars of requirements

We now have an increased stock of Squadron ties. Please contact us to ascertain if we hold the one you require

T.M.Lewin & Sons Ltd.

Established 1898

103 JERMYN STREET, ST. JAMES', S.W.1
PHONE: WHI 4291

Printed and Published in Great Britain by GALE & POLDEN LTD., Wellington Press, Aldershot. Overseas Agents, INDIA: THACKER, SPINK & Co., Calcutta and Simla. THACKER & Co, LTD., Bombay. HIGGINBOTHAMS, LTD., Madras and Bangalore. CANADA: WM. DAWSON SUBSCRIPTION SERVICE, LTD., 70, King Street East, Toronto, 2 Canada. AUSTRALIA and NEW ZEALAND: ANGUS & ROBERTSON, LTD. SOUTH AFRICA: W. DAWSON AND SON (S.A.) LTD., 29 and 31, Long Street, Capetown.

HAWKES & CO., LTD.

Civil and Military Tailors and Outffitters to Officers of the Royal Air Force

1, SAVILE ROW
LONDON, W.1
TELEPHONE: REGENT 0186

68, HIGH STREET
CAMBERLEY
TELEPHONE: CAMBERLEY 829

Uniforms and Mufti
Made to Measure

Lounge Suits, Overcoats, Hacking Jackets, Blazers, Shirts, Shoes, etc., in stock for Immediate Wear.

We have a ladies' department at both addresses.

TELEPHONE: AVENUE 3907

Dombey & Son

ESTABLISHED 1869

99 LEADENHALL STREET
. . LONDON, E.C.3 . .

R.A.F. BLAZERS MADE TO MEASURE

R.A.F. Badges and R.A.F. Squadron Badges Supplied

BOULTON PAUL AIRCRAFT LTD.

Designers
&
Constructors
of
Aircraft
&
Armament

LIBRARY
MAY 25 1949
UNIVERSITY OF CALIFORNIA

WOLVERHAMPTON
ENGLAND

14 DAY USE
RETURN TO DESK FROM WHICH BORROWED
LOAN DEPT.
This book is due on the last date stamped below, or
on the date to which renewed.
Renewed books are subject to immediate recall.

MAR 7 1967 8 7

RECEIVED
FEB 21 '67 -5 PM
LOAN DEPT.

RECEIVED
FEB 21 '67 -5 PM
LOAN DEPT.

AUG 3 1968 4 8

REC'D LD JUL 20 '68 -2 PM

LD 21A-60m-7,'66
(G4427s10)476B

General Library
University of California
Berkeley